PREMIERE ISSUE
TRS-80 MODEL 100*

PORTABLE 100

The magazine for Model 100 users

September 1983

$2.95

THE 100...A LEGEND BEFORE ITS TIME

MANAGE YOUR STOCK PORTFOLIO

WRITERS' TOOLS: FORMAT, FIND, COUNT

COLUMNS BY:
TANDY'S BILL WALTERS
COMPUSERVE'S BILL LOUDEN

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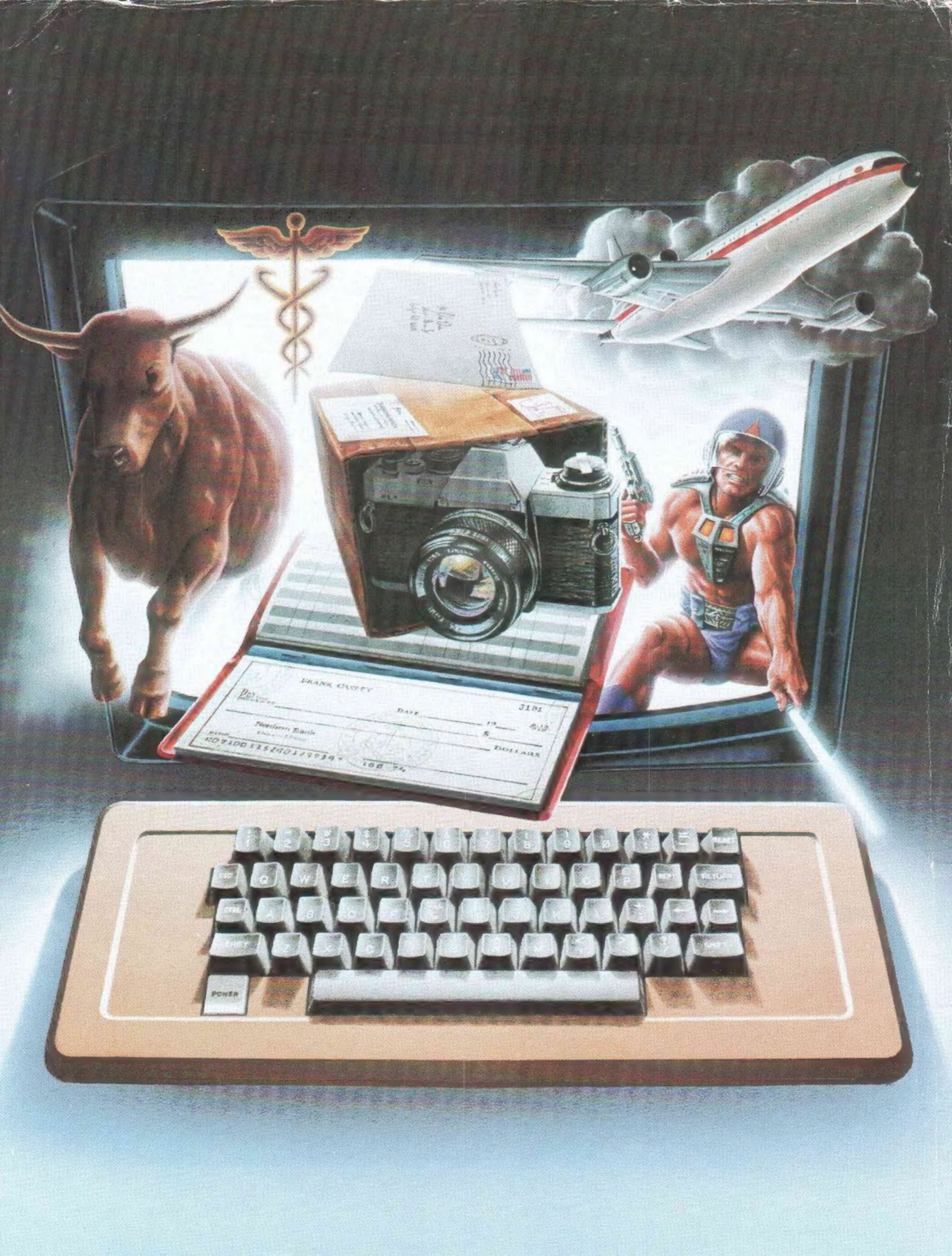
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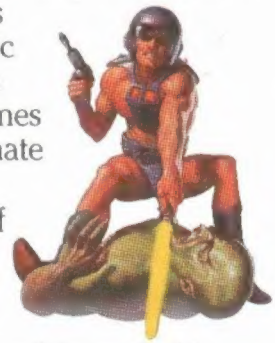

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ARTICLES

DEPARTMENTS

COLUMNS

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JOHN P. MELLO JR.

PREVIEWS

A LOOK AT THIS ISSUE AND A EULOGY OF SORTS TO THE STUFF OF PROMISE

Paper. I love the feel of it: bond, rag, newsprint — all of it. Since a tad curled up on a homebrewed braided rug in front of the tube, nothing, to my mind, has held more promise than a blank sheet of paper. Then why, oh why, you ask, have I embarked on this campaign to make *Portable 100* totally magnetic?

Take Edwin Dethlefson's article (page 40) on tracking your stocks on your 100. His query came across our transom on an innocent piece of paper. So did his first draft of the article. But then yours truly, Mad Magneto, took over!

MR. ROBOTO. Hours after receiving Ed's first draft, I critiqued it. Yes, in the age of Mr. Roboto and the form rejection, an editor actually critiqued a manuscript! Then I sent my suggestions to him by ringing him up with my 100. And when the time came to receive the final draft, we let our 100's do the talking for us again.

But that step wasn't cut and dried. I hadn't upgraded to 32K yet, but thanks to Bill Louden (page 22), I knew I really had a 128K machine. After Ed downloaded his article to me, I uploaded it to my file space on CompuServe. Then I returned to Ed and retrieved his program.

Richard Ramella, who's written *beaucoup* articles on the Color Computer, was new to the telecommunications game, but with his new 100, he was transmitting like a pro a in matter of minutes. He offers some invaluable writers' tools to anyone writing with a MEWS in the story appearing on page 26.

ROM LISTING. For an old hand like Jake Commander, who spends his idle hours disassemblying the 100's ROM, submitting a manuscript over the phone waves was a cinch. Jake says the 100's ROM listing is as thick as a stack of big city phone books. A glimmer of his travail to date can be viewed on page 25, where he lists every MEWS Basic keyword and its ROM address.

Telecommunications is also second hat to Charlie Bowen and Stew Schneider. Their familiarity with CompuServe enabled them to leave their manuscript in the nether reaches of Public Access, where it could be downloaded by an intrepid editor. For those still feeling their way through the system jungle, Charlie and Stew's piece on uploading and downloading on CIS (page 48) can be very helpful.

JONATHAN EDWARDS. Some things, though, we haven't been able to magnetize. Terry Kepner's article on building a null-modem connector (page 38) had a diagram. To my chagrin, I had to touch hard copy. I held the paper between my thumb and forefinger, eyeing it with controlled horror. I gained new insight into Jonathan Edwards' words "The God that holds you over the pit of hell, much as one holds a spider or some loathsome insect over the fire, abhors you, and is dreadfully provoked...."

As for your managing editor, I find myself writing more and more on my 100, and less and less on my Model III. And from my 100, the copy never sees manuscript paper. It's phoned directly to typesetting about two blocks away at Camden Type 'n Graphics. The owners, Connie and Doug Leavitt don't miss the paper.

Paper, ah yes, paper. I still love it — all of it. Well, maybe not all of it. I don't like wasted paper. Maybe that's why I've gone magnetic.

A WORD ABOUT LISTINGS...

Packed program listings have been a bane for us for a long time. Granted, packing lines is necessary to make Basic run faster, but it can be hell when you're trying to figure out how a program works. For you newcomers, a program line may be made up of several program statements separated by a colon. So when you're going through a listing in *Portable 100*, keep the following in mind.

When you see a line like this:

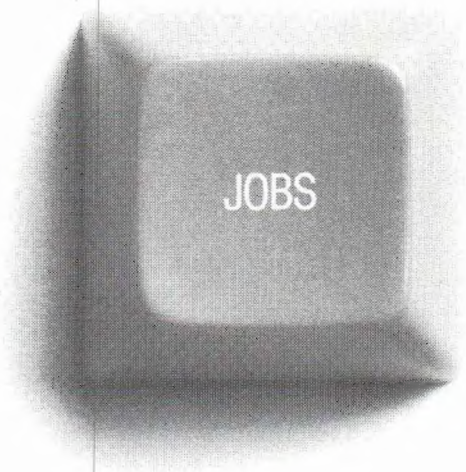
```
830 PRINT
    :PRINTTAB(2)"IT TOOK YOU ";DM;"
    MIN. AND ";DS;
```

It should be typed like this:

```
830 PRINT:PRINTTAB(2)"IT TOOK YOU ";DM;"MIN. AND ";DS;
```

This may be a little confusing for the novice, but you'll soon see it makes the listings easier to type into your 100 and easier to understand how the programs work.

—The Editors



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3. Access CompuServe.
4. At the command prompt, type GO PCS154

That's all you have to do to join the Model 100 Special Interest Group (SIG) on CompuServe. SIG membership is Free. Enjoy the benefits of up to the minute information, free programs, and good conversation with Jake Commander, Ed Juge, Bill Walters, Bill Louden, John P. Mello Jr., Kerry Leichtman, and other Model 100 users.

JOIN THE NETWORK NATION!

PORTABLE 100 The magazine for Model 100 users

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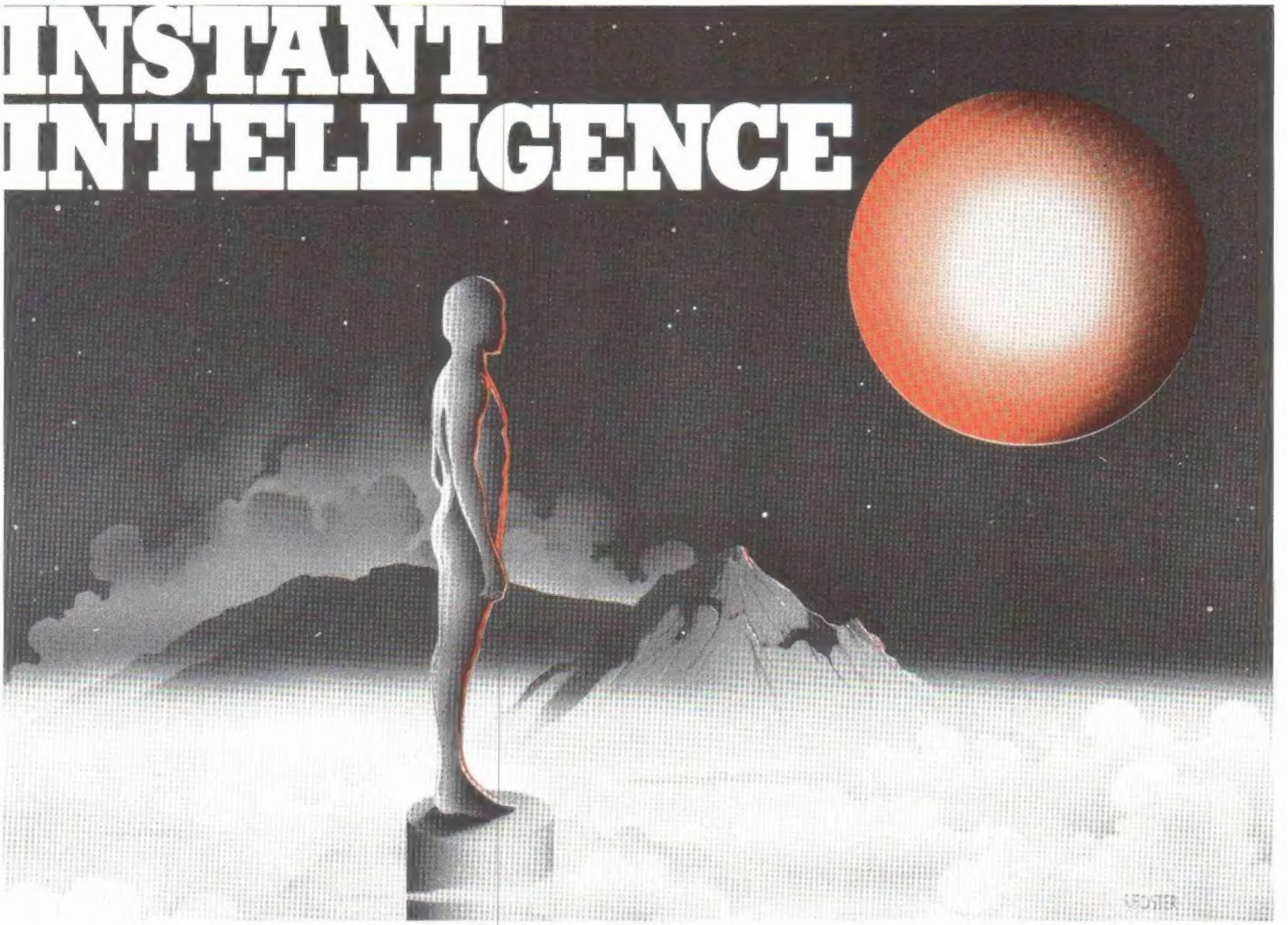

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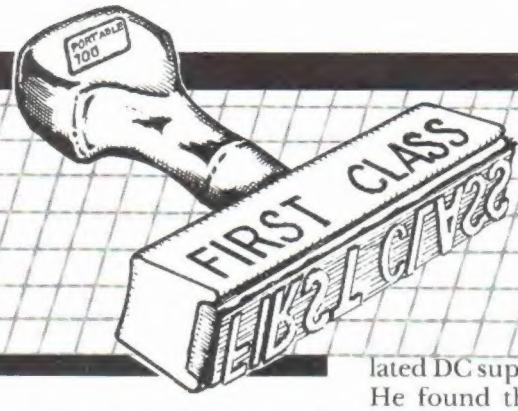


Editor's Note: While it isn't customary for a new magazine to have a letters section in the first issue, Portable 100 *is fortunate to also be system operator for the Model 100 special interest group on CompuServe. During the four months the 100 SIG has been online, many Micro-Executive Work Station enthusiasts have traded valuable information with each other. We think the new readers of* Portable 100 *will be interested in this sampling from the SIG. Each message writer is identified by his or her name and CompuServe identification number.*

NICAD TROUBLES SOLVED

For those concerned about the type of pips used on the ends of ni-cads....All ni-cads seem to have a pit at one end rather than a pip. For this reason, and due to the fact the springs at the connector terminals used in the Model 100 battery compartment end in a spiral, I simply took a good pair of needlenose pliers and diligently twisted the end of the spring steel coil until it poked outward toward the pit end of the ni-cad. Then ... I stretched out the coil somewhat and voila, the poker spring end slips right into the pit end of the ni-cad for a *verrry* positive connection. Although the batteries are somewhat more difficult to remove and install, I prefer this over a faulty connection.

For those of you who are not terribly good with your hands, I might suggest leaving this modification to a technician, simply because the spring steel is extremely intolerable to twisting and bending even with a good set of needlenosers. The job ended up becoming a 90-minute project.

Furthermore, the manipulator of this type of surgery must also be extremely careful not to damage either the springs or the plastic housing during his or her frustrating little negotiations with the wire coil and pliers.

Gordon MacCarthy
73125,677

MOD 100 GETS A LANTERN BATTERY

I got sick and tired of using two sets of batteries per week. I took a 6-volt lantern battery (the kind with screw-post tops) and built my own power source. It works beautifully since my 100 travels almost exclusively in my briefcase. It freaks people out when I pull out my 100 and have a wire leading into my case! I got just over one month out of it. I estimate that to be around 120 hours! Quite a savings over 4AA's!

Wayne
75655,242

FIGURES ON BATTERY LIFE

Battery life will be 20 hours if no external connections are made, i.e. you're not using the Modem or RS-232 interface. I forget the exact figures, but it is something like:

- 15 MA.—normal operation, no peripherals;
- 25 MA.—with modem operating; and
- 45MA.—with RS-232 operating;

Again, the figures are not exact but the best that I can remember.

Bill Walters
Tandy Corporation
75655,242

I have just talked with a friend, and he told me he substituted a regulated DC supply for the battery pack. He found that the machine draws approximately 60 MA at all times.

E. Brad Meyer
72356,75

CASES FOR YOUR MODEL 100, ANYONE?

I use the Color Computer carrying case for my 100. It will hold the 100, a minisette 9 (in it's PC-1 case), modem and cassette cables, AC power units, tapes, and manuals. Best of all, it's cheap and light in weight!

Walt Kuleck
70645,1313

I've been using the optional Pocket Computer-2 case with the 100 for quite a while and find it quite handy. It's velvet-lined and padded. There's room for the direct connect cable and a spare set of batteries, and it has two zipper pockets on the outside for papers. All you need to do is remove the two internal pockets. This can be done easily, within 10 minutes or so. Cut the thread on the top side of the pockets with a sharp blade— they barely leave a mark after they're gone.

Clay Schneider
70240,212

I have found an alternative case for my Model 100. Instead of purchasing the hardshell case offered by Radio Shack, I am using the smaller, neater case which is produced for the Suzuki Omnichord, a strange hybrid musical instrument. The 100 and its accessories fit into the case perfectly. And although I purchased the case with the Omnichord and don't know how much it costs exactly, I suspect the Omnichord case is less expensive.

David Peyton
76703,244

Need a nice case for UR 100? Sears and Brother make a small electronic typewriter approximately the size of the Mod 100. It has a carry strap, is lightly padded and waterproof, has a small outside pocket and best of all, fits perfectly. Price is under $10. What a bargain. It's a soft case, by the way. I have one and love it. Try it!!

Mike Suldo
73545,205

THE MODEL 100 TAKES TO THE AIR

I have used my 100 in my PA-28-180 with no effect on the navigation or communication radio that I can observe. I've also used it on TWA's L-1011's (in the passenger cabin). Other than causing no less than five attractive stewardesses to interrupt their work to ask me to explain what the 100 was, it had no noticeable detrimental affect on the operation of the aircraft.

Sandy Trevor
70000,130

Regarding interference with aircraft radios... I've been unable to observe any effect whatsoever on VHF, NAV, COM, DME, MKB, ADF, or RNAV. The M100 is a great aviation tool! Download an EMINAV flight plan, plus WX, and refer to it any time you want to in flight. Of course, just to be safe, I wouldn't turn the computer on during critical phases, like instrument approaches.

Reid Ashe
70230,130

FAA [regulations] part 91.19 applies to... (1) aircraft operated by an air carrier. It prohibits use of any portable electronic device on board unless it is a tape recorder, hearing aid, pacemaker, electronic shaver or... any other electronic device that the operator of the aircraft has determined will not cause interference with the navigation or communication system of the aircraft on which it is used... The air carrier would have had to determine that the specific device would not affect the specific aircraft's systems.

It would appear from this that.... as far as the general aviation planes vs. the airliners, they generally use the same navigation aids and frequencies. The airliners also generally use a lot of other frequencies for the Lorain and Omega fixes. I really am not trying to be picky about this, but I do have a genuine concern that the use of any such device may be a hazard to flight. I would be very wary of having a passenger on board with an operating Model 100 (or any other micro). It all depends on which navaids the plane is using at the time. As I understand it, the use of the device would be a violation for the FARS. The on board computers are checked out against the installed nav systems, the carry-on computer would make that trip into a test flight. Probably no harm, but why take the chance? I haven't checked out the 100 yet for RFI, but if the Model I, II, III, and 16 are any indication, then the potential for problems could be great.

Les Simpson
70120,236

DATA TRANSFER IN THE FAST LANE

In attempting to transfer a 28K text file from my Model 100 to my Model III, I became frustrated with the slow speed of the transfer and decided to dig out some of my other Mod III terminal programs.

I started with MODEM80 because it offers full support of the XON/XOFF protocol expected by the Mod 100. MODEM80, however, would only support 600 baud transfers without losing characters. OMNITERM and STERM also were limited to 600 baud. YUK!!!!!

Next I tried MicroTerm. Better.... It permitted 2400 baud transfers. Now we're cooking, I thought to myself! The transfer went fine with no errors.

By now I was hooked on this speed issue, though, so I dug out all 13 terminal programs I have in my library. After going through each one of them, I've found one which will permit me to transfer between my TRS-80 Model III and my Mod 100 at 9600 baud !!!! Now, that's really flying... and is definitely faster than I can transfer between my Mod II and my Mod 100.

For those of you who are interested, the terminal program I used at 9600 baud was TELCOM II. It retails for $70 and may be purchased from MUMFORD MICRO SYSTEMS, Box 400-E, Summerland, CA 93067 (805) 969-4557. I have no affiliation with Mumford, but am absolutely delighted with the high speed transfer it supports. It also offers full XON/XOFF support... which is a good thing! The Mod 100 screen keeps up very well at 9600 baud ('course you can't read it).

Gordon Williams
70150,344

COMPLAINT ABOUT DOCUMENTATION

I found a few typos in the ASCII character charts in both the manual and the pocket reference book press column. This makes a 1 (one) look like either an I or l and 0 (zero) look like O (capital O). I couldn't figure out why I couldn't get some of the characters entered until I figured this out. The characters affected are numbers 136, 175, and 192.

A couple of the symbols in the printed character column also are not quite right. The number 169 has the symbol turned 90 degrees, and number 185 is a capital B rather than the correct German character (which does look a bit like a B). The final error is only in the pocket guide: #0 is not generated by pressing pause.

Don't get the wrong idea. The first edition of any manual is bound to have errors. These manuals are many times better than the original Model I manuals (shudder).

Leonard Ericson
70465,203

WIFE CRITICAL OF 100

My wife just looked at my Model 100 and said, "You could have gotten a lot bigger computer for that much money!"

David Springs
74055,1672

So buy one for your wife! I must warn you, that if you let her on Compuserve, you will also need another phone line (separate number) and another phone!

Guerri Stevens
75675,1220

TERRY KEPNER

FULL-DUPLEX

Editor's Note: Full-Duplex is dedicated to solving readers' Model 100 problems. This issue, Terry Kepner will be answering some questions on the 100 that have popped up since he's had his machine. Readers needing assistance should address their letters to Terry Kepner c/o Portable 100, *Highland Mill, Camden, ME 04843.*

LOADING OUT THE RS232

How do I use the load command with the RS232? I can get the target program to load, but the Model 100 won't automatically return to Basic afterwards. I have to use break to terminate the load, getting an I/O error message. This obviously makes it impossible to use the "R" option with load. When I'm loading over the modem, I never know when the other computer is finished.

▶ I have the same problem with my system. The solution is to have the transmitting computer send a control "Z" (ASCII code 26). This code tells Basic the transmission is complete. I don't know why they didn't use the standard Control-T to signify the end of transmission of a file.

FOREIGN UPGRADES

I want to upgrade my Model 100 from 8K to 32K, but I can't afford to pay Radio Shack's price. Where can I get the RAM chips used in the Model 100?

▶ This is one case where you have to buy the chips from Radio Shack. The RAMs used in the Model 100 are special chips made to Radio Shack's specifications. Each 8K-by-8-bit RAM chip is actually four flat-pak, 16K-bit CMOS (Complementary Metal Oxide Silicon) RAM chips connected together on a larger carrier chip. Two are on top of the carrier, two on the bottom. So far the only source of these chips is the company selling them exclusively to Radio Shack. Until someone else appears on the scene as a second source, we'll have to buy our memory upgrades from Tandy.

You can buy the chips from Radio Shack National Parts for $85.16, and install them yourself, saving the $15 installation charge. The disadvantage to this is unless you really know what you're doing, you could ruin the chips while trying to install them.

Proper installation requires a static-free bench and non-magnetized tools. Make sure you release any static you may have picked up by touching a piece of *grounded* metal before touching your computer or the CMOS RAM chips. Remove your batteries, turn off the memory switch on the back (this must be done or you'll destroy the new chips and damage the other components), and remove the back cover. Remove the chips from their shipping boxes and gently place them in the sockets in your computer. Double check the legs of the chips to see they're not bent or improperly seated, then firmly and slowly press the chips into their sockets. Replace the cover and batteries, turn on the memory switch, and turn on the computer. If your display does not indicate 28K of memory, turn off the computer *immediately*.

Turn everything off, remove the batteries and cover, and recheck your new chips. Remove them from their sockets and put everything back together again. See if your unit's original 8K of memory is good. If not, you did something wrong and will have to take it to Radio Shack for repair.

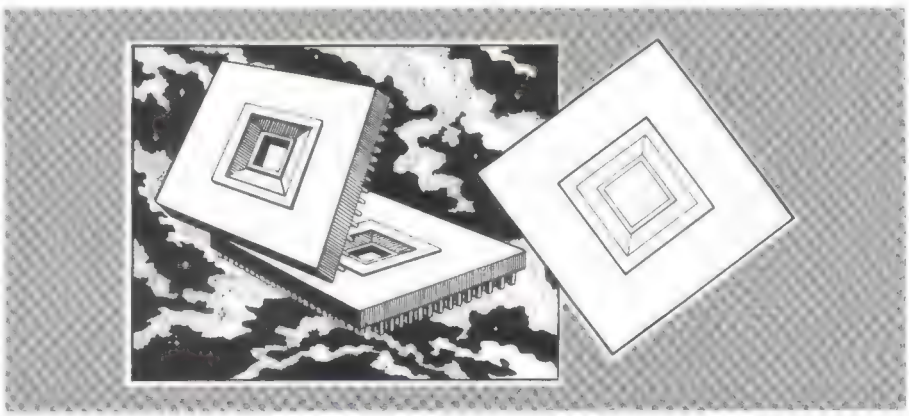
As you can see, doing it yourself is quite risky. Unless you have worked with CMOS chips before, don't try it. I had Radio Shack do mine for me, and watched the technician do it. Even he was worried at first. (It was the first time he'd installed CMOS in a Model 100.) In any case, opening your computer *will* void your Radio Shack warranty. Don't do it unless you're an expert.

BUG IN 100's BASIC

I've run across a bug in Basic which I think will interest your readers. Basic doesn't check the syntax of the ELSE command in an IF... THEN... ELSE statement. If the ELSE is misspelled, as in ESLE (like I did while typing fast), you won't get an error message from Basic. The statement beyond the ESLE just isn't executed. It took me hours to track this down the first time.

▶ Thanks for bringing that to our

Please turn to page 12



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Continued from page 10
attention. You'll be pleased to hear the rumor mill claims Radio Shack is working on an improved ROM for the Model 100.

THREE TO 100 TAPES

I've heard a rumor it's possible to read Model III tapes with my Model 100. Is this true? I want to use some Model III programs without having to type them in.

The answer is: yes and no. Both machines save data to tape at 1500 Baud. The 80C85 chip used in the Model 100 uses the 8080A machine-code instructions, which are a subset of Z80 machine-code. Since the Model III uses a Z80 CPU, the machine code written on the Model III is about 90 percent compatible with the Model 100. If the original code on the Model III didn't use any special Z80 instructions, then the code should be 100 percent compatible.

In the case of machine-language programs running on the Model III, you would have to replace all the Model III input/output code using the Model 100 input/output addresses and ports, since the two machines use different ports and methods of data interchange between the CPU and peripherals. In short, most Z80 code routines that don't use Model III addresses and ports for data I/O will operate on the Model 100.

Regarding cassette tapes, if you write a machine-language loader routine, you can read Model III data tapes directly. Machine-language and Basic programs (except Basic programs saved in ASCII format) won't load into memory correctly. Machine-language programs on the Model III tell the operating system where they have to load to operate. The Model 100 would either ignore these instructions or allow the program to load into memory and possibly overwrite programs or data already there. If the machine-language program were located in high memory, it could overwrite the Model 100's operating system RAM and totally mess up your computer.

Non-ASCII Basic programs would have difficulty because the tokens used in the Model III are not the same as those used in the Model 100. So, while you might get the program to load, it would be garbage as far as the Model 100 was concerned.

Transfering data can be done. To read Model III data tapes you need a loader routine in the Model 100. To read Model 100 tapes in the Model III, you need a loader routine in the Model III. Part of the difficulty is the Model 100 generates a short title program in front of the data that tells it the name of the program, and if it's data, text, machine-language, or a Basic program. The Model III would have to ignore that header. Similarly, the Model 100 would have to adapt to the absence of that header from the Model III.

In either case, you need a machine-language programmer to transfer data via cassette tape. A much simpler and easier method would be to use the RS232 ports of the two computers to shoot information back and forth.

COCO CONVERSIONS EASIER THAN I/III

How hard is it to translate Basic programs from the Model I/III to the Model 100? There're several programs I want to use that are available only for the Model I/III.

The Basic in the Model 100 and the Model I/III computers is very similar. In fact, with the exception of the graphic commands, even Color Computer Basic programs will work on the Model 100. I've converted seven programs from the Color Computer to the Model 100 and about 20 from the Model I.

When going from the Model I/III to the Model 100, the biggest problem is getting the screen displays to fit on the smaller display, while not losing any intelligibility (changing PRINT@, TAB, etc.). From the experience I've had so far, it's easier to convert Color Computer programs, sans graphics, than a Model I/III, because the screen size of the Color Computer comes closer to matching the 100's display (32 by 16 versus 40 by 8).

To transfer a program from the Color Computer, get a Y DIN-plug connector (one male plug for the Color Computer, with two female jacks for the other devices). Connect one female jack to the Color Computer RS232 cable, plug a null modem connector to the RS232 cable, then plug that into your Model 100. Connect the other female jack to the Color Computer printer cable, which you plug into your Color Computer printer. Now go to TELCOM on your 100. Set the RS232 to 47E2E (if you have the new 8-bit word RS232 Color Computer Basic 1.1, use 48E1E). Now go to TERM, then type LLIST on the Color Computer. The program will simultaneously be printed and go into your Model 100.

Transferring from the Model I/III is just as easy: use a terminal program on the Model III; set the baud rate to match your Model 100 (I found 1200 to be a reasonable speed); plug a null modem into the RS232 cable between the two computers; load the target program—in ASCII format—into your terminal program; and send it over to the 100. For both Color and Model I/III computers, don't forget to use the download option of TERM, or your program won't be stored.

An alternate procedure to getting the program into memory is explained in another letter in this column. The advantage to that method is the program is loaded directly into Basic and not stored as a text file, which cuts down on memory usage by about 25 percent. It also eliminates the problem of running out of room when you try to load the program into Basic from TEXT.

Once you have the program in memory, edit it to match your 100's display. If the program saves data to tape, add OPEN statements. If the data is to disk, change the OPEN statements to match the 100's syntax. One advantage to the 100 is OPEN is used to save data to RAM or tape (or any other peripheral) by specifying the appropriate prefix when prompted for the file name. (To save to tape, type "CAS:file name" in response to the "Filename?" prompt.)

One problem with disk-based programs is the lack of a direct access file structure on the 100. The only file structure supported is sequential.

Transfering Model II/12/16 programs should be as easy as Model I/III transfers, but I haven't tried that yet. The Basics are very similar, so I don't see any trouble with such conversions.

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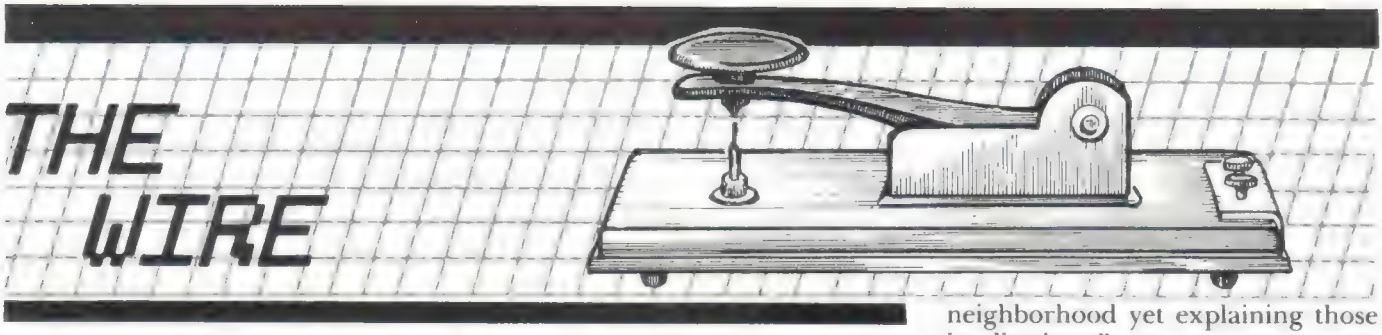


MICRO VISIONARY AT FORUM GAZES AT LIFE BEYOND BLINKING CURSOR

By SCOTT L. KAESAR

A telecommunications visionary sees the Model 100 as revolutionizing personal computing.

David Hughes, appearing at a telecommunications and politics symposium sponsored by Yale University in New Haven, CT, remarked, after his formal address to some 100 people attending the forum, that the Model 100 would revolutionize personal computing in the same way the Osborne did when it first appeared on the computer scene.

While he isn't wedded to any piece of hardware, Hughes said, "If I could have, tonight I would have brought a Model 100... I could have sat it right here and hooked it up to this [Sony video system] and I wouldn't have to carry a 25-pound Osborne."

MICRO VISIONARY. Hughes, a microcomputer visionary from Colorado Springs, CO, lives today as he believes all of us will live in the future: "I simply live and work by the western American version of the economic, technical, and cultural rules that I think will govern most of us in the bright future that I see lying beyond the blinking cursor."

Describing himself, Hughes said, "I'm a self-employed information man. By choice I've lived and worked for the past six years in our post-industrial society using a variety of small computers connected by an ordinary telephone over a modem to networks such as The Source, CompuServe and others.

"I study, think, teach, work, and write my tracts out of my old Colorado Springs cottage at the base of Pikes Peak."

Hughes is more than that, actually. A graduate of West Point and a teacher, he is also a pioneer electronic publisher who originated Source Trek magazine available on The Source.

He also operates his own electronic bulletin board — the focus of most of his discussion at Yale. During the course of his talk, he demonstrated how his system worked by dialing it on the Osborne computer he carried with him from Colorado.

In Hughes' view, the computer has the potential to increase communication between people, rather than cause alienation. The community he envisions will communicate on the national scale through electronic networks, like The Source, and on the local level through BBS's like his own.

THE NETWORK LIFE. "I share the electronic network life with tens of thousands of others around the world; bodies I have never seen, whose voices I have never heard, but with whose minds I meet nightly", he said.

Although Hughes has pursued a national electronic community, much of his focus is with local people and issues: "I've been preoccupied in Colorado, in rural areas and small towns, with the implications of the individual powered by the computer linked to other individuals... I will eventually learn something about the national role, but it will take 10 years to get to that point, because I haven't even got outside of my neighborhood yet explaining those implications."

Two events, in Hughes view, are making networks viable on both the national and local level. He points first to the proliferation of hardware and software and to declining prices for both: "When a Texas Instruments machine can cost $100 in the next few months and a Commodore PET gives people the ability to access for $200 to $250, and these prices are dropping, then cost becomes an irrelevent factor."

Hughes operates his local bulletin board (303-632-3391) from an 1894 tack house, "with a roof that leaks unerringly into a frontier spitoon and just misses a Radio Shack Model III."

INEXPENSIVE ACCESS. "There are at least 2,000 computers sitting out there with software that costs less than $150, and a modem that can simply answer the phone when it rings," he contends. "It's at that level that I've found great innovation. My Model III sits there and if the phone rings three times on an unmodified telephone, a tone is emitted and if the caller has a modem and a computer terminal, big or small, he or she can simply access it and read what I have in my electronic bulletin board."

Hughes sees those connections between people via machines occurring with growing frequency, especially because he believes computers and bulletin boards like his are no longer just for hobbyists: "You'd never have caught me with a CB radio. I'm just not a tinkerer. I don't care what goes on in these chips, just that they work. I use these tools, I don't engineer them. I don't invent them. My son can program all that I need to do. In fact, I believe that one of the world's great myths is that everyone has to be able to program. I think it's a very serious disservice."

Hughes' bulletin board gained political prominence as the result of

Editor at Work. When Tandy President John Roach and former Vice President for Computer Merchandising Jon Shirley keynoted a forum sponsored by the Boston Computer Society, *Portable 100* Managing Editor John Mello couldn't resist the opportunity to see the Tandy bigwigs in person. Here he's taking notes at the session with his ever present 100. The photo is courtesy of the society and Hub Graphics.

a story which appeared on The Source. He had been asked to set up a community college course to introduce computers. He called the course Electronic English, "...and I don't mean word processing", and taught a cross-section of people in Colorado Springs.

"I found no correlelation between their technical background and their success in the course," Hughes said. "There was a greater correlation between success and their ability to use the English language."

Hughes' Source story describing those findings attracted the attention of Red Boucher, at that time Alaska's lieutenant governor. Boucher flew to Colorado Springs to meet Hughes. The politician wanted Hughes to set up an electronic college program so he could complete his degree at Colorado Technical College linked by telecommunications to his Apple in Alaska. The course eventually attracted 12 students. It also brought Hughes into politics.

MICRO ON LAST FRONTIER. Hughes went to Alaska, where Boucher was running in the Democratic primary for governor. He found Boucher setting up electronic bulletin boards for schools in remote locations. "Boucher has an intuitive understanding of computers," Hughes said, "He understands the power of information and knowledge."

So Hughes signed on for a time as Boucher's electronic campaign manager from Colorado Springs. That experience led to some hometown political activity.

Hughes was approached by several candidates: "I said I wasn't going to lick stamps, but what I would do is put anything the candidates felt about any issue on the bulletin board. So anyone who dials it up can read it."

Three candidates eventually offered position papers for the bulletin board. "Anyone, anywhere could have dialed them up and read — not what the press said they said — but simply their exact positions. Then in the messaging system, readers could ask questions and pose points of their own," Hughes explained.

After a story in the *New York Times* mentioned Hughes' political activity, he received a call from Richard Adams of the Republican National Committee. Adams said he thought there was too little Republican activity on the bulletin board and offered to assist any Colorado Springs Republican candidates.

NATIONAL TO LOCAL FLOW. In response, another computerist called supporting a Republican candidate for the state legislature. So information began flowing from the national party to a local candidate, Hughes explained. "When that election was over, it seemed to me that we were laying down the methods — on a local basis, with local candidates — by which local issues could be discussed and people could get into an active dialogue."

Hughes believes the objective and informational style of computer electioneering offers advantages beyond just communication: "When an individual can ask a candidate and get an answer, there's a great deal that's personal in it. Further, there's no body language. You don't see the candidate, whether he speaks well, looks well, and is groomed for television. It becomes issue-oriented rather than personality oriented."

For Hughes, the biggest surprise came after the election was over. Although the position papers were taken off the system, dialogue about local issues continued.

"When the city planners decided to offer an ordinance restricting home occupations," he observed. "I happened to think that was important. I got the planning commission to delay it for one month, and I came home and read the ordinance over the telephone — I can't type — to a word-processing service which typed it up for $3 per page and then uploaded it back into my bulletin board. Then I wrote a letter to the

Please turn the page

editor of the local paper in Colorado Springs asking people with terminals to call up and read the ordinance and take some appropriate action.

DOWN IN FLAMES. "The city never knew what hit them," the micro visionary said. "I never went to a meeting. I never went out and organized, but 175 people showed up at a city hearing and shot that ordinance down in flames. Most importantly, it was a cross-section of the public. To my astonishment, high-tech people from large firms dialed in during the day, took the ordinance off on a printer, put it on the Xerox, and passed it out all over their plants.

"The city councilmen got more calls on that issue than virtually any other, yet the only thing that was unique about it was that it existed in written form only on a bulletin board, the bulletin board being a Radio Shack Model III with a $150 program and a modem."

His experiences have convinced Highes of the importance microcomputers can have on elections in the future: "What I'm suggesting is that there is an enormous difference between individuals on the local level using the computer during a campaign to create this kind of accessibility than there is simply having an expensive centralized set of data bases or mailing lists."

INFORMATION END RUN. "There are five million computers out there now," he said, "and there will be another five million by the end of this year. And whether you're a campaign worker or whether you're the League of Women Voters, the added cost to do this is insignificant. If you multiply that possibility by the number of small, locally-owned computers, we have immense possibilities for localization that has absolutely nothing to do with the national distributors of information, or even the public distribution [of information] through the media."

"I've got a suspicion," Hughes said, "that with this new telecommunications technology, the reader is in charge, not the writer. The ability to initiate the discussion, not at the candidate's end but at the public's end, may have very significant effects on the meaning of politics at the local level."

MULTITUDES GATHER AT NCC SHOW, OGLE NEW GAVILAN, SHARP MICROS

by CHRIS BROWN

Two exciting new computers piqued the curiosity of the assembled multitudes at this year's National Computer Conference in Anahiem, CA. And, not surprisingly, both machines were portables.

In an otherwise mundane floor show heavy on mainframe and minicomputer hardware, Sharp Electronics of Paramus, NJ, and upstart start-up Gavilan Computer Corporation of Campbell, CA, stole the show. In each case, a snazzy new portable that sends the message, "you can take it with you," was involved. Where Sharp's PC-5000, and Gavilan's Mobile Computer are concerned, you definitely can take it with you... assuming, of course, that you can pay the freight.

SHARP TOTABLE. Sharp's PC-5000 is a full-blown, 16-bit machine using an Intel 8088 cpu. In standard configuration it is equipped with 192K bytes of ROM and 128K bytes of RAM. The RAM is expandable to 256K bytes. In addition, a supplemental 128K bytes of bubble RAM is available in the form of a plug-in cartridge.

The PC-5000 is powered by a rechargeable set of nickel-cadmium batteries in the portable mode, and an AC line adaptor when not on the road. The 11-pound PC-5000 measures roughly 13-by-12-by-13.5 inches and will stash in an attache case or under an airline seat with ease.

An eight-line-by-80-column liquid crystal display is used in the PC-5000. The fold-up display has a resolution of 640 by 80 dots in the graphics mode and offers users 51,000 pixels of bit-mapped graphics to play with. A full character set of 256 alphanumeric characters and symbols is provided.

To extract the most from the PC-5000 users will have to opt for some of the many system add-ons Sharp has made available. First, there is an audio cassette recorder that gets data and programs into and out of the machine at 1600 bits per second. If tape is too slow, users may opt for 5.25-inch floppy disk drives. These double-sided, double-density units will store 320K bytes of information each, and operate under the direction of MSDOS 2.0. Compatibility with this disk operating system ensures a wealth of quality applications will be instantly available.

OPTIONAL MODEM. Then, there is communication with the outside world. An optional 10-key modem/auto dialer plugs into standard Bell direct connect jacks, and offers 300 baud operation in RS232C format. Ten autodial memories are available and a loudspeaker on the front of the unit permits voice, as well as data exchanges. The modem has a built-in ringer and operates with either Touchtone® or telepulse systems. For international calling, 16 digits per number can be stored in the autodial memories.

Predictably, a printer is also an option in the PC-5000 system. Sharp has craftily designed this printer to plug into the rear of the computer without increasing its overall size or foot print. Thus, a printer-equipped PC-5000 is merely heavier, not larger, than its printerless counterpart. The high density, matrix-type printer will operate in either thermal or impact modes, at 37 characters per second. The print format is 80 characters per line with 10- and 12-pitch densities possible. Graphics printing can make use of up to 1197 dots per 80 column line.

Software is one of the PC-5000's

strongest suits. Bubble cartridges will soon be available from Sharp containing word-processing, spreadsheet, communications, data-base and executive-planner programs. In addition, whatever is written to run under MSDOS 2.0 for the IBM PC will also run on the PC-5000.

At $2500 in its optionless state, this computer certainly isn't cheap. But for users who want full function from a portable machine and aren't squeamish about price, it's a damn nice computer.

GAVILAN'S TOTE. For high rollers who scoff at spending a piddling $2500 on a portable computer, Gavilan Computer Corporation has a solution: start at $4000 and work your way up. Desktop computer users may do a double take, however, at the amount of equipment and innovation that Gavilan supplies for $4000.

The Gavilan "Mobile Computer" is a 9-pound, 8088-based gem that measures 12.5-by-12.5-by-3 inches. The unit features a bit-mapped, liquid crystal display with an 8-line-by-66-column format. An internal graphics interface is also provided facilitating the use of an external, large-format screen display.

An 80K-byte internal RAM is supplied, 32K available to the user. Up to 128K of system RAM and 128K bytes of ROM-based software can be added. Total memory available in the Mobile Computer is 336K. A serial, 9600 baud interface is supplied, and a built-in 300 baud direct connect modem.

Gavilan's Mobile Computer can operate for up to eight hours on its internal batteries. After a one-hour quick charge, the unit is good for six more hours of operation. An AC adaptor is supplied for home use and a recharging unit is also standard equipment. Other standard equipment includes one Hitachi, 3-inch floppy disk drive.

The diminutive Hitachi drives store 320K bytes of information on plastic-cased micro floppy cartridges. A second micro floppy drive can be chained to the system. The choice of a 3-inch format for this microfloppy is a tacit admission on Gavilan's part that the microfloppy standard issue has been settled. Time will tell, however, if the standards battle is resolved in favor of the three-inch media or the larger 3.5-inch format.

MICRO WITH A MOUSE. Gavilan has taken an interesting approach to the issue of the user interface. Users are provided with a touch-sensitive panel called a solid-state mouse. This panel allows the user to alter the position of the cursor in a relative manner. Thus, users can point, via the touch-sensitive panel, to menu selections, commands, or any of several system functions including help, select, and view. Once the cursor is located over the desired prompt, the user merely touches the screen to initiate action. The help function is always available and context sensitive. Thus, perplexed users can instantly receive guidance no matter where they are in an application.

Like Sharp, Gavilan makes several pieces of optional equipment available. At the top of the most wanted list is the plug-in printer ($1000). This 5-pound, self-powered unit operates at 50 characters per second in a sheet-feed mode. Eighty characters per line of correspondence quality printing is available.

Other options include an acoustic coupler modem, a 12V, cigarette lighter, power cable that allows the computer to be used in a vehicle, and plug-in memory expansion modules of ROM, RAM, PROM and EPROM. A second microfloppy disk drive is also an option.

ROM CAPSULES. Gavilan also supplies a comprehensive package of ROM-based software, dubbed Capsuleware. In addition to the 48K bytes of system software, word-processing, spreadsheet, communications, filing and forms processing packages are available. These applications-oriented programs should meet the needs of many users, most assumed to be executive types. For users who require more specialized software, the Mobile Computer's compatibility with MSDOS ensures ready access to some of the best new programs being written for machines like the IBM PC. In addition, Gavilan plans to support the Basic and Pascal programming languages for users who want to code their own.

Gavilan and Sharp have broken new ground in terms of price-performance ratios in portable computers. Users wanting full features, lightweight, compact styling and portability are no longer limited to one or two extremely expensive and exotic machines. Now, mere mortals can pack a 16-bit punch in their vagabond valises for about the same price as a week at Waikiki or a trans-Atlantic crossing on the QE II. While not yet plebian, the price structure of high-end portable computers is at least headed in the right direction.

JAKE COMMANDER

PORTABLE COMMANDER

JAKE IS SEDUCED BY TANDY'S NEW PORTABLE

Until early March 1983, I'd never heard of the TRS-80 Model 100. I didn't have an inkling of what Radio Shack was about to spring on an unsuspecting world. Then, on the evening of March 3rd, the phone started ringing and, unbeknownst to me, all that was about to change.

It was the very Shack themselves in the form of Ed Juge. He asked if I could help with a project that required an independent viewpoint. Apart from the fact it was to do with the release of a new portable microcomputer, he wouldn't tell me a darned thing. It was too much to resist. I'm a sucker for mystery and intrigue.

TATTERED SCHEDULE. Within three days I found myself on a plane destined for Fort Worth. My schedule lay in tatters behind me. Projects and papers were left in disarray. But since I've made a significant portion of my living in the last three years via TRS-80 microcomputers, a visit to Fort Worth felt like a long overdue pilgrimage. And besides, I was going to see a new microcomputer still under wraps!

Bill Walters (the project manager of the Model 100) met me at Fort Worth and whisked me off to a secret rendezvous. Over a much-needed cocktail, he asked me to guess what the new machine was like and what features it might have. So I guessed.

I knew it was a portable. That much was easy. The *Wall Street Journal* had already carried a report and there were too many rumors flying around to ignore. So I kept guessing.

"It's a portable," I ventured like a true coward. Bill Walters kept a straight face and didn't look too impressed. He wasn't exactly stunned by that one. "Yes?" he queried patiently and ordered another cocktail. "And what else do you think it might have?"

CHEESE NOISE. A reasonable question, I thought. After such a chicken-hearted start, I thought I'd have to do better next time. I was going to have to bait him. If he was going to play cat and mouse, I was going to be a piece of cheese. And make a noise like one.

So I kept guessing. I'd got an idea it might look something like an Osborne portable, only smaller. (Probably because I'd had a preliminary glimpse of an Osborne portable only smaller just a few days earlier.)

"Disks." I was still playing it relatively safe. No lateral thinking for yours truly. Just good old uncontroversial sure-thing guesses. It *had* to have disks. "No, it doesn't have disks," replied Bill Walters.

My mind reeled. I was taken aback, but I kept a dead-pan expression. I started thinking more cliches. "What? No disks!" and that kind of thing. I thought they were nuts. A portable with no serious storage. Who on earth did they think would go for that? But Bill Walters looked smug. It seemed like I'd run straight into a well-laid trap. Here's him, brimming with confidence over Radio Shack's new baby. Here's me, full of consternation, certain the Shack really lost their marbles this time. But that look.

DEAD PUZZLED. I was dead puzzled and he knew it. By the time we arrived at my hotel, he still hadn't taken off the wraps and I was bursting to know what this dumb portable could possibly be.

Taking the cloak-and-dagger to a new height, Walters furtively removed a parcel from the trunk of his car. Now would you believe this parcel is actually covered in anonymous brown paper? The fact they really didn't want anyone to know about this thing until they said so is beginning to dawn on me.

I try to look cool and composed as

we both stroll into the hotel lobby with this secret package. It looks for all the world like we just took delivery of a new blow-up doll that very day. The hotel receptionist never even glanced at the parcel. They must be used to businessmen away from home.

That's how, not long after, I found myself alone in my room perusing this strange new phenomenon—the TRS-80 Model 100. By this time, I'd signed an agreement to keep mum about the whole thing and had thus been woven inextricably into the plot.

So this was what it was all about. I fondled it gently and as I became more confident, gave it a more thorough going over.

I'd been taken on a lightning tour of the Model 100's many features. I'd already watched as the machine automatically dialed and logged on to CompuServe. I'd seen the split-screen display in the telecommunications mode and had played with its high resolution graphics in Basic. It's trim size was beginning to appeal to me and that battery powered operation meant I need never travel alone again. The address handler program was going to appeal to business people. So was the appointment scheduler.

WHO NEEDS DISKS? And no problems about losing files! With a 32K machine, it was all too apparent why disks were of only secondary importance.

That huge liquid crystal display—I was entranced. I had a feeling I was watching another nail go in the coffin of the old fashioned typewriter.

As I sit here, six weeks later, typing into that same Model 100 at my dinner table, I realize I was already falling in love with this beauty.

Perhaps now's the time I should confess that was the first night I actually took a computer to bed with me. (I've since discovered Bill Walters does the same thing, too.) I was convinced microcomputing was about to enter a new dimension as the benefits of true portability became apparent. Back at the hotel, I propped up the pillow and typed in a paragraph or two. I cut out a sentence from here and pasted it back over there. I was in seventh heaven. This was *much* better than a blow-up doll.

BILL WALTERS

TANDYTALK

COUNTLESS TRIPS AND E-LETTERS LATER TANDY BIRTHS THE 100

Welcome to "Tandytalk." It will be my job in the coming issues to keep you tuned into some of the more interesting developments that affect you, the TRS-80 Model 100 portable computer user (or future user as the case may be). I will always try to be as fair as I can about our products, but the facts are that, well, just plain and simple, I'm biased. With good reason, I might add.

Let me give you just a quickie tour of Radio Shack and the way computer products are handled so you can have a little background and feel for us.

The person responsible for all computer products is Jon Shirley, vice president for computer merchandising. Ed Juge, director of computer merchandising, reports to Jon and is responsible for directing six buyers, four software product planners and some 20 software analysts.

BUYERS MORE THAN BUY. Each buyer is totally responsible to Jon and Ed for the management of all items, both hardware and software, within their specific product category. This includes buying, i.e. product development strategy, finding new products, and final negotiation and acquisition of the new items. It also includes the product line management functions of developing items we've decided to work into the product line as salable goods. Finally, the buyer controls all pricing, distribution, and advertising of the products under his control.

We have one buyer in charge of Model II/12/16 products, one buyer for color and pocket computers, one buyer for all common peripherals (printers mostly), and one in charge of all other accessories. I happen to be in charge of the Model I/III/4 / 100 product lines. No, I didn't forget how to count. The sixth buyer is stashed away working on new, unannounced products. You didn't think we were stopping with the 100 did you?

Microsoft's Bill Gates
His development team "tremendous."

The software product planners work with the buyers to find new software and shepherd it through development. Our software analysts are the final quality assurance group and are very adept at finding most potential traps an unwary user might wander into while trying to run any of our software packages. No one does it all by themselves and computer merchandising is no exception.

CAST OF HUNDREDS. There is a cast of several hundred support people in the areas of systems and applications software, hardware design, technical publications, technical support (repair), and customer support — each putting his or her personal touch in every product, all in an effort to provide the best possible item for our customers.

I was asked to give a little background on the development of this most interesting, yes, even revolutionary, product, the TRS-80 Model 100. I'll try to begin at the beginning.

As a new buyer I was asked on a Saturday morning to review a folder of telexes on a new product proposal recently sent to us from Japan and to make comments and suggestions the following Monday. I did. I thought the proposed product was terrific but it needed a few changes here and there, such as auto-dial capability for the modem, and a few other little things.

The hardware was pretty straightforward. The key was going to be the software. Without good integrated software, this would be just one more small computer in the line of small computers surely coming. The combination of software specifications seemed endless. Over and over so it seemed — initial specifications, objections, reworked specifications (at least four separate iterations of that!), then finally... agreement!

THE HARD WORK. Then came the hard work, getting all those nice

software goodies we had worked out to fit inside a 32K Read Only Memory (ROM). American Airlines loved me. Boy did they love me.

It seemed like from April to November, I lived out of a suitcase at the Mariott in Seattle and worked the durndest hours at Microsoft. I still have trouble believing how many problems were solved at 3 a.m. by someone saying it just wasn't worth arguing anymore; the feature would be added, changed, deleted, or fixed, whichever was appropriate.

Throughout this process, Bill Gates and his development team at Microsoft were tremendous. They played devil's advocate, stuck to their guns or yielded, all at just the right times. I think they agree the shoe felt the same on the other foot, too. Even now when I use my Model 100, I marvel at the amount of features we squeezed into it.

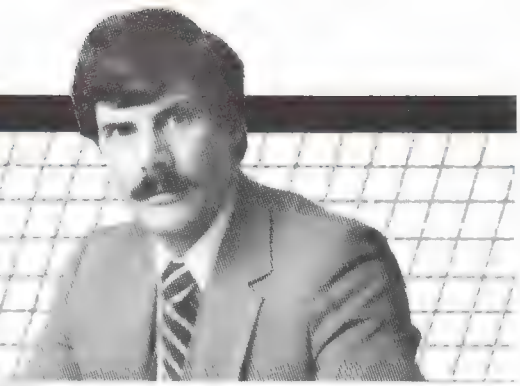
E-MAIL BELIEVERS. When not in Seattle, electronic mail (e- mail) kept the members of the development team in daily contact and provided them a complete meeting-type forum (albeit a bit delayed) as well as a complete written record of all matters discussed along with the decisions. This was the first use of e-mail in the development of a product by Radio Shack and it made many firm believers in the e-mail concept. It didn't matter if one of the members was traveling or not, all they needed was a portable terminal to keep up.

Speaking of traveling, I carried a Model 100 as soon as samples were available. However, even more frustrating than not having one along on a flight, was having one in my briefcase and not being able to pull it out, since the announcement was to be some five to six months later! Now, however, I find it doesn't matter. Every time I've pulled it out on an airplane, I haven't been able to use it anyway! I'm too busy answering questions about it and passing it around to fellow travelers so they can get a look!

We're all very pleased to be able to bring you a product we feel is truly revolutionary. I look forward to being able to share experiences and insights with you in the months to come. If you have some particular topic you would like to see covered, please address it to me in care of *Portable 100*.

BILL LOUDEN

TELECOMPUTING



INCREASE YOUR 100'S STORAGE WITH 128K FROM COMPUSERVE

Having access to 128K of storage from any phone in North America would be a real plus for any portable computer owner, but for the Model 100 owner with CompuServe it's a reality.

CompuServe provides every subscriber with 128,000 characters of disk space. He or she can use the space to send or retrieve electronic mail, store notes, and even archive Model 100 Basic programs.

I recently attended a two-day seminar in New York on personal computing. While everyone took notes with a pencil, I took mine on my Model 100! I filled my 100's RAM by noon, but with one local phone call, I was able to transmit my notes in less than three minutes to my disk space in Columbus, OH, where I later retreived them. The Model 100 with its built-in modem and TELCOM made the connection easy.

First, access CompuServe. When you purchase a Model 100 cable from Tandy (Radio Shack catalog no. 26-1410), you get one free hour on CompuServe.

ACCESSING CIS. The Model 100 offers two methods for accessing CIS — direct-connect modem and acoustic coupler. Since the 100's acoustic coupler isn't available as I write this, I'll confine myself to the direct connect access method.

The connection to the phone line is fast and easy. Take the direct-connect modem cable and insert the computer connector (the 8-pin off-white DIP plug) into the jack marked phone at the rear of the 100. Make sure the DIR/ACP (direct/acoustic coupler) switch on the left side of the computer is on DIR and the ORG/ANS (originate/answer) switch is on ORG. Disconnect the telephone line from the telephone — *not from the wall!* Insert the telephone line into the modem cable's beige connector and the cable's silver wire into the telephone.

CONNECTING TO CIS. Enter the TELCOM program, then press the call key (F2). Type in the the CIS telephone number and include the characters after it. Press enter. The Model 100 will display "Calling" while it dials the number. After you're connected, you'll hear a beep and the 100 will enter its terminal program. You can access CIS through Tymenet or Telenet, but I'll be limiting myself to a direct connection to CIS. After entering TERM, hold the control key down and press C. You will then be asked for your user identification. Once that is entered you will be asked for your password. Your password will not appear on the screen for your security.

Your screen display will appear similar to figure 1.

To go directly to your disk space, enter EXI at the function prompt (!). Your screen will display OK. You are now in your disk storage area. To look at any files present, enter DIR for a directory. Your directory will be displayed in the format in figure 2.

The first column is your file name and extension; the second, characters used for the file; and the last, the creation date. The format of CompuServe file names are similar to Model 100 file names. A mazimum of six characters may be used for the file name and an optional maximum of three characters may be used for an extension.

100 TO CIS. How do you get files from your Model 100 to CompuServe? Easy! CompuServe provides a file generator editor called FILGE. Think of FILGE as the bucket you'll pour your Model 100 file into. First enter FILGE file name.extension of the file you wish to create. FILGE will respond:

New file TEST.DAT created - ready

You have now opened the file and may transmit your Model 100 file to CompuServe.

Press the upload key (F3). The message "File to Upload?" will appear on your screen. Enter the file name to send to CompuServe and press enter. The prompt "Width?" will appear. Enter a width for your file. CompuServe requires a car-

```
9:34 EDT Monday 16-May-83

CompuServe Information Service

1 Home Services
2 Business & Financial
3 Personal Computing
4 Services for Professionals
5 User Information
6 Index

Enter your selection number,
or H for more information
!
```

Figure 1.

```
MOD100.DAT 3200 16-May-83

ADDRESS 3200 01-May-83

EAST.DO 9600 09-May-83
```

Figure 2.

riage return prior to the 132nd character you send it. To avoid a loss of data, enter an output width as if you were printing a report. I normally use a width of 64 since I have a Model III at home to access CIS.

The CompuServe FILGE file will now be filled with your Model 100 file. Actually, the FILGE file thinks you're manually typing in the file at 30 characters a second! Don't type on the Model 100 keyboard while you're uploading or it will be included in your file.

UP will be displayed in reverse video during the upload process. When the UP changes to normal video, the file has been transmitted. All that's necessary now is to close the FILGE file.

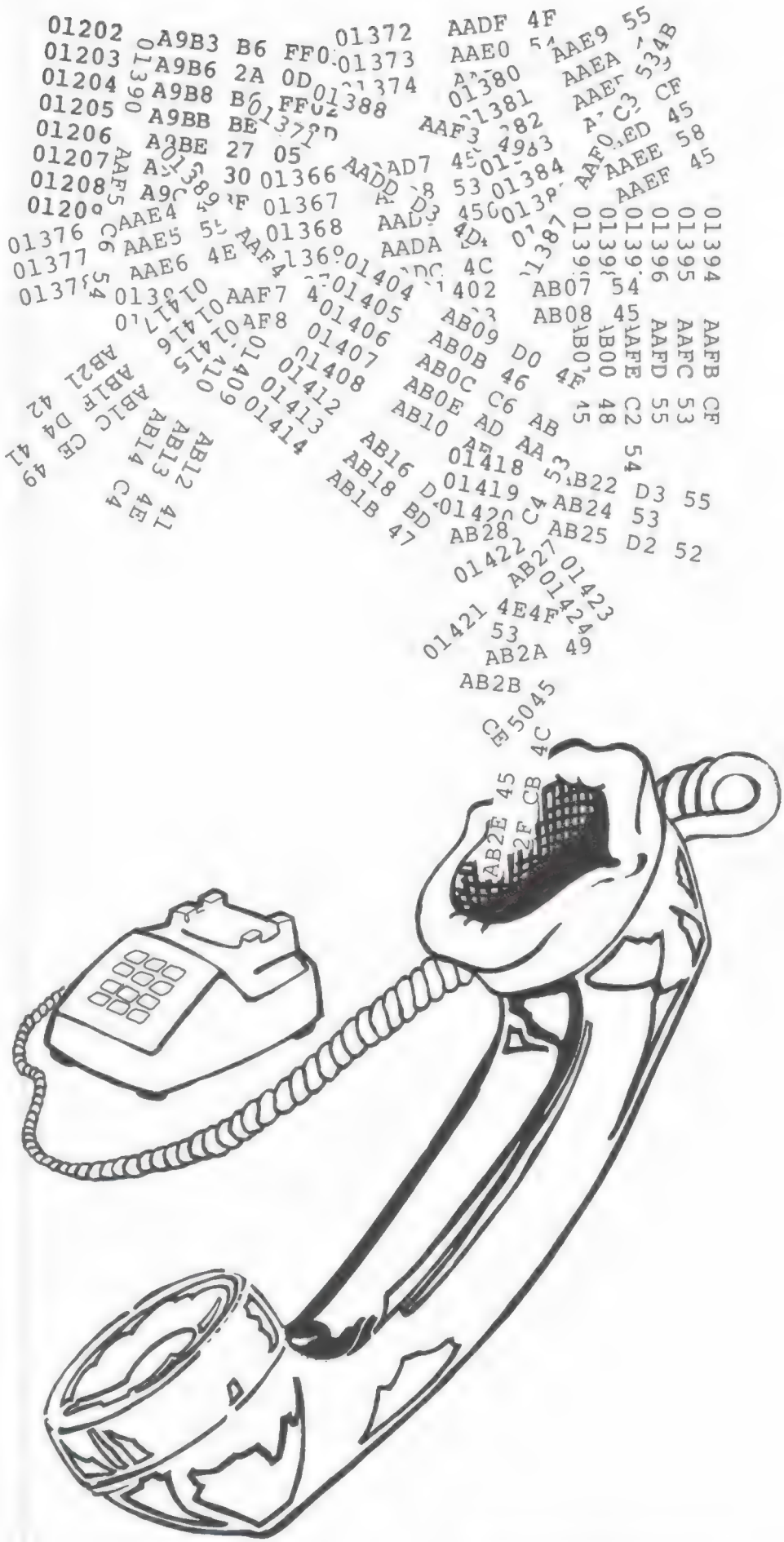
Enter a /EX on a new line. The slash (/) as the first character of a new line tells FILGE what follows is a command. The command /EX will close the file and take you back to OK.

DOWNLOADING. Downloading from CompuServe is even easier. Once you are at OK, enter TYP and the name and extension of the file you wish to download. Before you press enter, press DOWN (F2). Your Model 100 will prompt "File to Download?" Enter a file name for your 100. Press enter to begin downloading the CompuServe file. The down label will also appear in reverse video until the download is complete.

You may exit your disk area and return to the CompuServe menu mode by typing EXI followed by enter. To disconnect from CompuServe, type BYE followed by enter. Then press BYE (F8) on your 100.

The file you downloaded may require minor editing on your Model 100. Use the editor and position it to the top of the file that should be deleted. This was the enter that started the download process. Also at the end of the file you should see a blank line and an OK. These should also be deleted.

Up- or downloading a Basic program is just as easy as a text file. The only difference is you press enter when asked for the width. However, if you think the Basic program has lines over 132 characters in length, enter 132 for the width and edit the Basic file on your Model 100 later.



ROM ADDRESSES: GETING BASIC TO DO WHAT YOU WANT

How does Basic do what you tell it to do? Clues to the language's subservience lie in ROM.

By JAKE COMMANDER

How on earth does Basic know what to do? All those statements, commands, and functions, yet the interpreter untiringly plods through your code always knowing what's required next. Just how does it do it?

Well, if the answer were simple, everybody would be writing Basic interpreters and putting MicroSoft out of business. But it is possible to follow at least some of the pathways Basic uses to perform its duties.

Most addresses of the ROM routines which comprise Basic are held in two tables. These can be unravelled to give a list of routines used to perform various tasks.

JUMP ADDRESSES. One table contains jump addresses for the commands (or verbs, as it were) which will always be the first thing the interpreter picks up from a statement. The whole repertoire of such commands is catered for the table located at 0262 hex.

Basic gets the appropriate jump address by using the token number for the command it's about to execute. All tokens are numbers from 128 to 255; therefore subtracting 128 gives numbers from zero to 127. As each jump address in the table is two bytes long, the token (minus 128) is multiplied by two to give an offset into the table. This points straight at the address which is needed. The two-byte address is picked up and jumped to — and we're now executing a Basic command in pure machine code.

What happens next depends entirely on the machine code for the command itself. Various syntaxes are allowed for some commands but not for others. For instance, the print command would allow an expression such as TAB(22);1/3 , so would an LPRINT. But a LET would have none of that. LET X = TAB(22);1/3 would have you on the carpet in no time.

Also various combinations of tokens can do different things. The comparison operators, for example, can be used pretty much interchangeably. These operators, >= <> =< , etc are all OK syntactically. This versatility means a table for such a wide set of possibilities is nigh impossible.

<> =< etc., are all OK syntactically. This versatility means a table for such a wide set of possibilities is nigh impossible.

SECOND TABLE. However, there is a second table at location 004E in the ROM. This contains many addresses used in the evaluation of Basic math functions and expressions. These are extracted and jumped to in a similar fashion to the first table.

Any Basic word excluded from either of these tables is handled separately by the interpreter according to its particular use. However, out of a possible 128 tokens, these two tables give us a mechanism by which we can follow the machine-code execution of many of them. It is the combination of these routines and the syntax checking required to logically execute them that makes up an interpreter.

The following list has been compiled from the two tables I've described and a disassembly of other parts of the ROM. It shows the entry points for all important Basic statements and functions. Certain functions can have more than one possible syntactic use and the list does not cover all such uses. (An example is the statement OFF, which can be SOUND OFF or MOTOR OFF etc.)

The list is in four columns. The first is the address in ROM where the Basic word occurs in the vocabulary table. The second entry is the word itself. Third is the token assigned to that word when it is encoded by the Basic interpreter.

FOURTH COLUMN. The fourth column contains the address the interpreter jumps to to execute the token representing the statement or function desired. Once again, some statements can have more than one use such as MID$ (LH$)=RH$, and LH$=MID$ (RH$). In these cases, two addresses are given: one for use on the left hand side of the equals sign and one for the right hand side of the sign.

Perhaps unsurprisingly, things get a little more complicated with the mathematical functions in Basic. It's not simply a matter of taking an address for, say, a multiply routine and then jumping to it. The Basic interpreter has to know the numeric type of operator it has to work on. For instance, with the addition operator, Basic has four choices: signed integer, single precision, double precision, and string. None of the other binary operators allow string manipulation, so they're limited to the numeric variable types only.

The addresses of these binary operators can be confirmed (if you need confirmation) from three short tables in ROM — one each for double precision, single precision, and integer numbers respectively. The tables contain six addresses apiece for addition, subtraction, multiplication, division, exponentiation, and comparison. Rather than clutter the token-address table, these addresses are contained separately at the end.

In a following article, I'll be looking at ways to use some of these addresses in your own machine-code programs. For the more adventurous, an experiment will probably prove irresistable. Remember, though, in a RAM-file machine such as the Model 100, a lock-up may cost you all your files. Use caution.

JAKE'S ROM ADDRESSES FOR BASIC KEYWORDS

0080	=> END	=	80	@	409F	
0083	=> FOR	=	81	@	0726	
0086	=> NEXT	=	82	@	4174	
008A	=> DATA	=	83	@	099E	
008E	=> INPUT	=	84	@	0CA3	
0093	=> DIM	=	85	@	478B	
0096	=> READ	=	86	@	0CD9	
009A	=> LET	=	87	@	09C3	
009D	=> GOTO	=	88	@	0936	
00A1	=> RUN	=	89	@	090F	
00A4	=> IF	=	8A	@	0B1A	
00A6	=> RESTORE	=	8B	@	407F	
00AD	=> GOSUB	=	8C	@	091E	
00B2	=> RETURN	=	8D	@	0966	
00B8	=> REM	=	8E	@	09A0	
00BB	=> STOP	=	8F	@	409A	
00BF	=> WIDTH	=	90	@	1DC3	
00C4	=> ELSE	=	91	@	09A0	
00C8	=> LINE	=	92	@	0C45	
00CC	=> EDIT	=	93	@	5E51	
00D0	=> ERROR	=	94	@	0B0F	
00D5	=> RESUME	=	95	@	0AB0	
00DB	=> OUT	=	96	@	110C	
00DE	=> ON	=	97	@	0A2F	
00E0	=> DSKO$	=	98	@	5071	
00E5	=> OPEN	=	99	@	4CCB	
00E9	=> CLOSE	=	9A	@	4E28	
00EE	=> LOAD	=	9B	@	4D70	
00F2	=> MERGE	=	9C	@	4D71	
00F7	=> FILES	=	9D	@	1F3A	
00FC	=> SAVE	=	9E	@	4DCF	
0100	=> LFILES	=	9F	@	506F	
0106	=> LPRINT	=	A0	@	0B4E	
010C	=> DEF	=	A1	@	0872	
010F	=> POKE	=	A2	@	128B	
0113	=> PRINT	=	A3	@	0B56	
0118	=> CONT	=	A4	@	40DA	
011C	=> LIST	=	A5	@	1140	
0120	=> LLIST	=	A6	@	113B	
0125	=> CLEAR	=	A7	@	40F9	
012A	=> CLOAD	=	A8	@	2377	
012F	=> CSAVE	=	A9	@	2280	
0134	=> TIME$	=	AA	@	19AB	1904
0139	=> DATE$	=	AB	@	19BD	1924
013E	=> DAY$	=	AC	@	19F1	1955
0142	=> COM	=	AD	@	1A9E	
0145	=> MDM	=	AE	@	1A9E	
0148	=> KEY	=	AF	@	1BB8	
014B	=> CLS	=	B0	@	4231	
014E	=> BEEP	=	B1	@	4229	
0152	=> SOUND	=	B2	@	1DC5	
0157	=> LCOPY	=	B3	@	1E5E	
015C	=> PSET	=	B4	@	1C57	
0160	=> PRESET	=	B5	@	1C66	
0166	=> MOTOR	=	B6	@	1DEC	
016B	=> MAX	=	B7	@	7F0B	19DB
016E	=> POWER	=	B8	@	1419	
0173	=> CALL	=	B9	@	1DFA	
0177	=> MENU	=	BA	@	5797	
017B	=> IPL	=	BB	@	1A78	
017E	=> NAME	=	BC	@	2037	
0182	=> KILL	=	BD	@	1F91	
0186	=> SCREEN	=	BE	@	1E22	
018C	=> NEW	=	BF	@	20FE	
018F	=> TAB(	=	C0	@	0C01	
0193	=> TO	=	C1	@	076B	
0195	=> USING	=	C2	@	4991	
019A	=> VARPTR	=	C3	@	0F7E	
01A0	=> ERL	=	C4	@	0F56	
01A3	=> ERR	=	C5	@	0F47	
01A6	=> STRING$	=	C6	@	296D	
01AD	=> INSTR	=	C7	@	2A37	
01B2	=> DSKI$	=	C8	@	5073	
01B7	=> INKEY$	=	C9	@	4BEA	
01BD	=> CSRLIN	=	CA	@	1D90	
01C3	=> OFF	=	CB		various	
01C6	=> HIMEM	=	CC	@	1DB9	
01CB	=> THEN	=	CD	@	0B2A	
01CF	=> NOT	=	CE	@	1054	
01D2	=> STEP	=	CF	@	0783	
01D6	=> +	=	D0	*		
01D7	=> −	=	D1	*	See	
01D8	=> *	=	D2	*	table	
01D9	=> /	=	D3	*	at end	
01DA	=> ^	=	D4	*		
01DB	=> AND	=	D5	@	1097	
01DE	=> OR	=	D6	@	108C	
01E0	=> XOR	=	D7	@	10A2	
01E3	=> EQV	=	D8	@	10AD	
01E6	=> IMP	=	D9	@	10B5	
01E9	=> MOD	=	DA	@	37DF	
01EC	=> \	=	DB	*	377E	
01ED	=> >	=	DC	@	0E29	
01EE	=> =	=	DD	@	0E29	
01EF	=> <	=	DE	@	0E29	
01F0	=> SGN	=	DF	@	3407	
01F3	=> INT	=	E0	@	3654	
01F6	=> ABS	=	E1	@	33F2	
01F9	=> FRE	=	E2	@	2B4C	
01FC	=> INP	=	E3	@	1100	
01FF	=> LPOS	=	E4	@	10C8	
0203	=> POS	=	E5	@	10CE	
0206	=> SQR	=	E6	@	305A	
0209	=> RND	=	E7	@	313E	
020C	=> LOG	=	E8	@	2FCF	
020F	=> EXP	=	E9	@	30A4	
0212	=> COS	=	EA	@	2EEF	
0215	=> SIN	=	EB	@	2F09	
0218	=> TAN	=	EC	@	2F58	
021B	=> ATN	=	ED	@	2F71	
021E	=> PEEK	=	EE	@	1284	
0222	=> EOF	=	EF	@	1889	
0225	=> LOC	=	F0	@	506D	
0228	=> LOF	=	F1	@	506B	
022B	=> CINT	=	F2	@	3501	
022F	=> CSNG	=	F3	@	352A	
0233	=> CDBL	=	F4	@	35BA	
0237	=> FIX	=	F5	@	3645	
023A	=> LEN	=	F6	@	2943	
023D	=> STR$	=	F7	@	273A	
0241	=> VAL	=	F8	@	2A07	
0244	=> ASC	=	F9	@	294F	
0247	=> CHR$	=	FA	@	295F	
024B	=> SPACE$	=	FB	@	298E	
0251	=> LEFT$	=	FC	@	29AB	
0256	=> RIGHT$	=	FD	@	29DC	
025C	=> MID$	=	FE	@	2AC2	29E6
0260	=> '	=	FF	@	0A90	

	+	−	*	/	>	Cmpr
D.P.	2B78	2B69	2CFF	2DC7	3D8E	34FA
S.P.	37F4	37FD	3803	380E	3D7F	3498
INT	3704	36F8	3725	0F0D	3DF7	34C2
String	28CC					270C


MY PENCIL BOX

FORMAT YOUR WORDS WITH THIS TEXT AID

With a little Basic help, your 100 can be a hot-shot word processor.

By RICHARD RAMELLA

Though its text-handling capabilities are diverse, the Model 100's built-in, word-processing program lacks features needed by many wordsmiths. So I wrote TEXTHELPER, a fairly short Basic program that formats printed documents in useful ways.

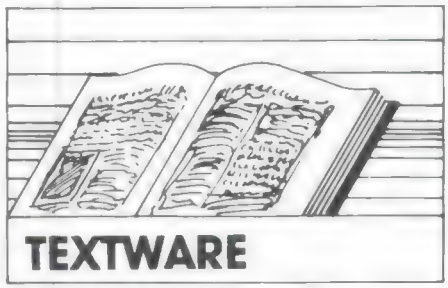
With this program, you may set side margins from 0 to 20, single-, double- or triple-space, and print page numbers, headers, and footers. The text is automatically printed in a spaced format so it continues from page to page with uniform margins at top and bottom. It is for use with standard 8½-by-11-inch paper.

And just to show you my heart's in the right place, I've thrown in a little routine that counts the words in a document.

FASTER THAN HAND. The format printing process occurs quite slowly by computer standards but still is perhaps 10 times faster than the human hand and unerring in following your instructions. Sophisticated and lightning-quick word processing is on the horizon for the Model 100, but those programs you won't get for the cost of a few magazine pages.

The experts may want to skip ahead here, because I'm starting at the beginning for the many Model 100 owners just getting acquainted with their machine.

The Model 100 has several kinds of files. The two we'll deal with are text documents and Basic programs. The program TEXTHELPER is a Basic program. It calls up material in a text file and sends it to the line printer, which prints it on paper in the format you have determined.



What you need to know about creating a text file is in chapter eight (pages 43–60) of the manual that came with the computer. Once you are able to create a text file, write words in it, and save the file, you can use this program.

MENU MODE. In the menu mode, the text file you create will be followed by the file name extension .DO. Using TEXTHELPER, you may call up only .DO files for formatting.

Before you Run TEXTHELPER, there must be a text file in the system, and you must know the exact name of it. This isn't difficult because you named the file when you created it.

A note of caution is warranted here. When you create the text file, make sure you don't use the tab key on your 100. And although your typing teacher may have taught you to leave two spaces between sentences, don't do it here. The results will be bizarre.

Let's say you want to format a file listed in the menu as MOM.DO. (It's a long overdue letter to your poor old gray-haired mother.)

This program is so user-friendly many experienced computer jockeys are going to be kicking out program lines left and right. But it protects the novice computer user from mistakes in numerous ways.

As the program begins, a two-item menu is shown. Type 1 and tap enter to try the word counter. Or type 2 and tap enter to try the document formatter. Tap anything else and you must try again until you get one of the two acceptable answers.

WORD COUNTER. If you try the word-counter routine, it asks for the name of the file to be accessed. The file name is MOM.DO, but you just type in the word MOM in any mix of upper and lower case, and the machine understands. The program displays WORDS: followed by a number that grows as each word is counted. When it's through counting, you know it because you're told "Tap M to return to MENU."

The document formatting part of the program is more complex in its workings but not complex in use.

DECISIONS, DECISIONS. To format, you must make several decisions. I'll list them in turn:

- You're asked what margin from 0 to 20 you wish. A choice less than zero or more than 20 is unacceptable. Paper sized at 8½-by-11 inches will hold about 85 characters on a line. Note that 9½-by-11-inch computer paper is actually 8½ inches wide after you tear off the tractor-feed margins. If your line printer allows changing the width of letters, I advise you to set it at 10 characters per inch so 85 characters fit snugly between one edge and the other. Otherwise, this program may give you unintended results.

The number you choose for a left margin is exact but on the right it is approximate. Both are about the same, but the right margin allows a bit of grace. This is because the program doesn't go to the next line until it encounters a line feed or blank space occuring after passing the line length determined by the margins it passed. This prevents line feeds in mid-word.

- That brings us to the next choice. If you select a right margin of 10 and a left margin of 10, then you'll have a line with about 65 characters (85 minus 20) in it. The program tells you this and asks: "Is this okay?" If it isn't, type N for no and tap Enter.

Please turn the page

Continued from page 27

You'll get another try at setting margins and may keep trying until satisfied. Answering Y for yes sends the program onward.

• A menu for line spacing is shown. Your choices are 1 for single space, 2 for double space, and 3 for triple space. If you are printing a single-spaced document on a single page, it's better to use the print function included with the Model 100's text-processing program.

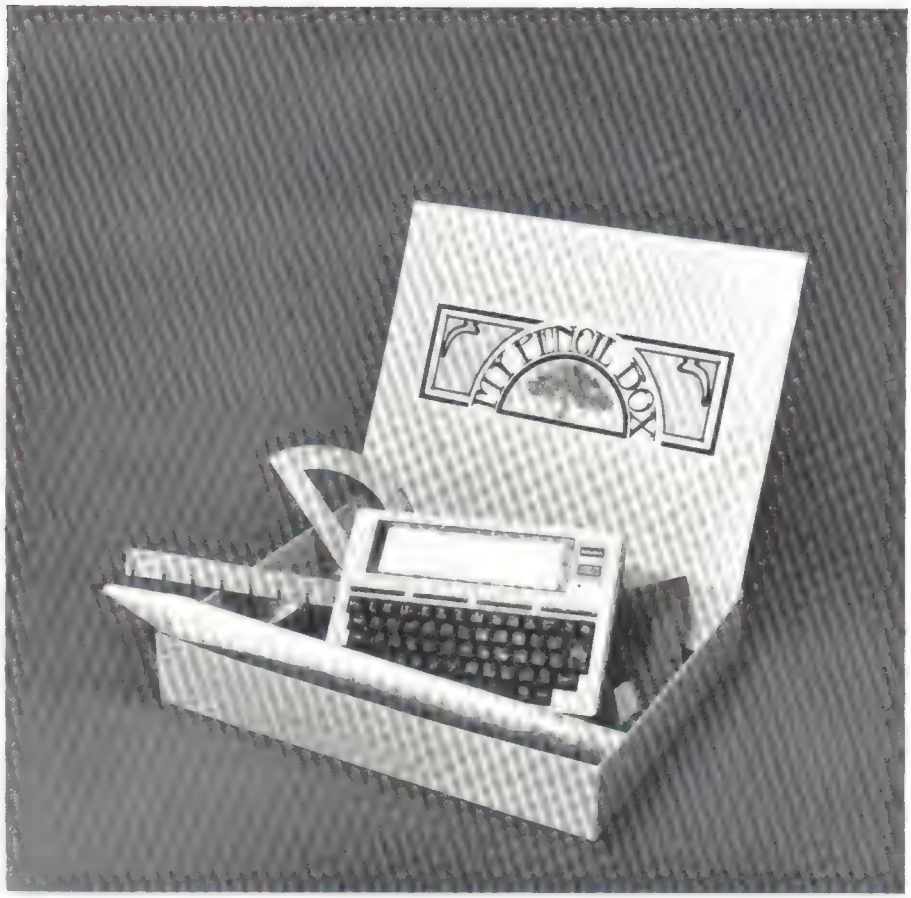
Single-spaced text gives you 50 lines a page, double-spaced 25 lines, and triple-spaced 16 lines.

• Now choose your header. A header is just word-processing jargon for a title. You don't need a header on a letter to mom, but in other cases it's very useful: War and Peace — Fifth Draft... Annual Report... and the like. You are given a limit here for the number of characters you may put in the header. It's based on the number of characters in the formatted line. If your header is too long, you get a chance to write a shorter one. In fact, it's mandatory.

The header also includes three other interesting things: the date, the time, and the page number. These are provided automatically. I'm afraid that by including the exact time on each page, I've revealed exactly how slow this program can be – more than two minutes for a double-spaced page 65 characters wide.

• The final format choice is the footer. It goes below the final line on the page and approximately flush with the right of that line. A footer may say (MORE), (CONTINUED) or any other message you want on each page. Don't make it too long; if it is longer than the number of characters in your line, you may get an error message and a crashed program. Trusting you to follow this advice, I have not built in a rescue should your footer exceed the number of characters in the line.

GENTLE REMINDER. Now the program reminds you to turn on the printer and position the paper. On my ancient Line Printer III the paper is positioned if the top of the print head is even with the perforation across the top of the first fanfold page on which I will be printing.



You may have to experiment for the best setting on your printer.

On the same screen display as your final reminders are the words: "Enter name of text file to be formatted." In our hypothetical case, we type the word "mom" and stand back for some turtle-like formatted printing.

If your printer doesn't jam the first time you look away from it, you might go into the kitchen for milk and cookies while it does its work. You can get pretty bored watching this program run – even when it's printing your own deathless words.

```
100  REM * TEXTHELPER *
101  REM * TRS-80 Model 100 *
102  REM * By Richard Ramella *
110  CLS
120  PRINT "Menu:"
130  PRINT STRING$(24,"-")
140  PRINT "1 - Word Counter"
160  PRINT "2 - Document Formatter"
170  PRINT STRING$(24,"-")
180  INPUT "Number of your choice";A
190  IF A<>1 AND A<>2 THEN CLS
       : PRINT"Choices limited to..."
       : GOTO 120
200  CLS
       :H=0
       :P=0
210  IF A=2 THEN 340
220  REM * Word Count Routine *
```

*See p. 4 for an explanation of *Portable 100*'s program listing format.

CONFUSED about choosing software??

NEW

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Circle No. 12 on Reader Service Card

```
230 W=1
240 INPUT "Name of file for word
    count";N$
250 OPEN N$ FOR INPUT AS 1
260 A$=INPUT$(1,1)
270 Z$=Z$+A$
280 N=N+1
290 IF N>3 THEN Z$=RIGHT$(Z$,3)
300 IF EOF(1) THEN 780
310 IF A$=CHR$(10)THEN W=W+1
311 IFLEFT$(Z$,1)<>CHR$(32) AND MID$(
    Z$,2,1)=CHR$(32) AND RIGHT$(Z$,1)<>CHR$(
    32) THEN W=W+1
320 PRINT @ 165,"WORDS:";W
330 GOTO 260
340 REM * Document Formatter *
350 INPUT "Margin width (0 to 20)";M
360 IF M<0 OR M>20 THEN CLS
    : PRINT "Note limits"
    : GOTO 350 ELSE M=INT(M)
    : CLS
370 WL=85-(M*2)
380 PRINT "Margins of"M"left and right
    yield"
390 PRINT "a line of
    about"WL"characters."
400 INPUT "Is this okay (y/n)";G$
410 IF G$<>"y" AND G$<>"Y" AND G$<>"n"
    AND G$<>"N" THEN CLS
    :GOTO 380
420 IF G$="n" OR G$="N" THEN CLS
    : GOTO350 ELSE CLS
430 PRINT "Spacing:"
440 PRINT STRING$(15,"-")
450 PRINT "1 - single"
460 PRINT "2 - double"
470 PRINT "3 - triple"
480 PRINT STRING$(15,"-")
490 INPUT "Choose 1, 2 or 3";SP
500 IF SP<>1 AND SP<>2 AND SP<>3 THEN
    CLS
    : GOTO 430 ELSE CLS
510 PRINT "Header up to"WL-
    19"characters."
520 INPUT "Header choice";HE$
530 IF LEN(HE$)>WL-19 THEN CLS
    :PRINTHE$
    :PRINT "too long."
    :PRINT
    :GOTO 510
540 CLS
550 INPUT "Footer choice";FO$
560 CLS
570 PRINT "Line printer on? Paper
    positioned?"
580 PRINT "Enter name of text file to be
    formated."
590 INPUT N$
600 P=1
610 FOR A=1 TO 4
620 LPRINT
630 NEXT
640 XX=1
650 GOSUB 880
660 LPRINT
670 LPRINT
680 OPEN N$ FOR INPUT AS 1
690 LPRINT SPACE$(M);
700 A$=INPUT$(1,1)
710 IF EOF(1) THEN PRINT "Document has
    been printed in chosen format."
    :GOTO780
720 LPRINT A$;
730 H=H+1
740 IF H>WL AND A$=CHR$(32) THEN FOR
    V=1TO SP
    :LPRINT
    :J=J+1
    :NEXT V
    :LPRINTSPACE$(M);
    :H=0
750 IF A$=CHR$(10) AND SP>1 THEN J=J+1
    :FOR V=1 TO SP-1
    :LPRINT
    :J=J+1
    :NEXT V
    :LPRINT SPACE$(M);
    :H=0
    :ELSE IF A$=CHR$(10) THEN J=J+1
    :H=0
    :LPRINT SPACE$(M);
760 IF SP=1 AND J=50 OR SP=2 AND J=50
    OR SP=3 AND J=48 THEN GOSUB 810
770 GOTO 700
780 CLOSE 1
790 PRINT @ 240,"Tap M to return to
    MENU"
800 IF INKEY$="" THEN 790 ELSE 110
810 LPRINT
820 LPRINT
830 LPRINT SPACE$(85-(M+LEN(FO$)));FO$
840 FOR S=1 TO 8
850 LPRINT
860 NEXT S
870 IF SP=3 THEN LPRINT
    :LPRINT
880 J=00
    :IF XX=0 THEN P=P+1
890 LPRINT SPACE$(M);CHR$(32);HE$;CHR$(
    32);CHR$(32);DATE$;CHR$(32);TIME$;SPACE$
    (3);P
900 LG=LEN(HE$+CHR$(32)+DATE$+CHR$(32)+
    TIME$+SPACE$(7))
910 LPRINT SPACE$(M);STRING$(LG,"-")
920 IF XX=1 THEN XX=0
    :RETURN
930 FOR S=1 TO 3
940 LPRINT
950 NEXT S
960 LPRINT SPACE$(M);
970 RETURN
980 END
```

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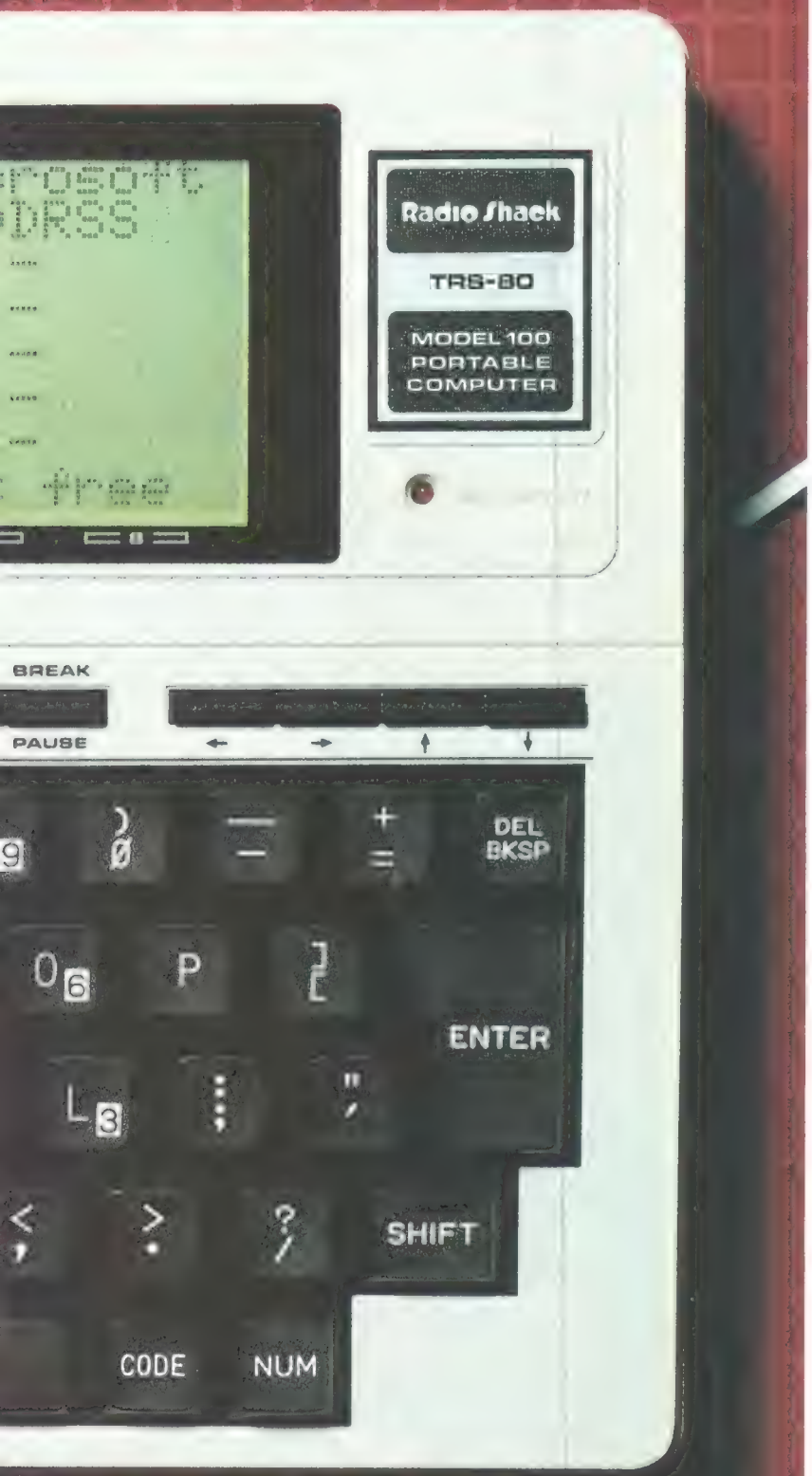

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PASTE
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THE MODEL 100 A LEGEND BEFORE ITS TIME

Only six months old and already a winner, the Model 100 has taken microdom by storm.

By JOHN P. MELLO JR.

Revolutionary. That's the word for the TRS-80 Model 100, according to the Tandy Corporation.

"There just isn't any other machine that's ever been made that interacts in this manner," declared Jon Shirley at the spring meeting of the Boston Computer Society. Shirley, then Tandy's vice president for computer merchandising, is now president and chief operating officer for Microsoft Corporation. Microsoft designed the software for the 100.

"I felt the concept was a revolutionary concept, but the key, to my mind, wasn't the physical hardware," Bill Walters, the Model 100's buyer, told *Portable 100*. Walters shepherded the 100 for Tandy from inception to market.

BELLWETHER. "If you take the software out of the 100," he said, "it's just another box." He maintained the 100 is a bellwether for microcomputing: "You're going to see more transparent operating systems, operating systems that create

an invisible shell for friendly systems."

At the Boston forum, Shirley—in an apparent reference to Apple Computer Corporation's Lisa—sniped at "another famous machine...10 times the price" of the 100 that "almost" totally interacts with its programs the way Tandy's Micro Executive Work Station does.

The other famous micro, Shirley went on to note, does not totally interact with its programs. "There are a lot of little gotchas there," he observed. "There are no little gotchas with [the Model 100]." Then he added in a humorous vein, "We'll build ours in later."

SWEET REVENGE. The sustained publicity the 100 has received must be sweet revenge for Tandy, whose announcement of its Model 12 in January was swamped by fondling press coverage of Lisa.

Even *PC* magazine ran a lavish spread on the 100, an unusual move for a periodical dedicated to the IBM Personal Computer. Author Corey Sandler explained the decision this way:

"The TRS-80 Model 100 Portable Computer is not compatible with the IBM PC. Why, then, is it appearing in the pages of *PC* magazine? Simply because this micro microcomputer is so well-equipped and practical that it makes direct disk-to-disk compatibility seem irrelevant.

"Radio Shack's Model 100 offers a tool for business people, writers, and travelers straight out of the once-amazing days of Dick Tracy and his wristwatch television set."

REVOLUTIONARY? What of Tandy's claim the 100 is revolutionary? You won't find microcomputer pundits disputing it. They're preoccupied praising the machine. Competitors don't have time for disputation either. They're too busy rushing knockoffs of the 100 to market.

Augustin Hedberg, in a *Money* magazine article on portable computers, appears to support Tandy's revolutionary claim. "The Model 100 is so packed with goodies it could well become the machine of the year," he wrote. "Just the fact that someone who knows absolutely

Please turn the page

Continued from page 35

nothing about computers can sit down with the Model 100 and in less than 10 minutes be writing letters on it puts it in a class all its own."

He added, "The Model 100's internalized software system—no more disks, drives, and interminable strings of commands to memorize—marks a giant step forward in the rapprochement between man and machine."

GREATER ACCEPTANCE. Writing in *Infoworld,* Aaron Goldberg, a senior research analyst for International Data Corporation in Framingham, MA, called portable computing an important evolutionary step in the development of microcomputers because it will lead to greater acceptance of computers in the office and the home.

"As word processing maintains its premier importance in the scope of office application needs," he said, "products such as the Radio Shack Model 100 will grow in importance because they truly extend the functions of the office beyond corporate walls."

"Let me risk this prophecy," he added. "Since many people now own more than one calculator—one on the desk, one at home, one in the briefcase—can widespread ownership of personal computers be far behind?"

Even if the advent of the two-computer family isn't imminent, the advent of competition is. Tandy's arch-rival Apple is preparing its "Elf" and IBM its "Peanut". The 100's brother, the NEC 8200, is expected to be released by summer's end. And later this fall, Spectravideo of New York is expected to throw its chip in the ring.

The Spectravideo Execumate reportedly will sell for under $1000. It will have a display of 16 40-character lines. The software will include a text editor, Basic, and multiplan. The micro will have 64K of ROM and 32K of RAM, which could be upgraded to 64K.

BANDWAGON EFFECT. This bandwagon effect of the 100 may, above all else, be the strongest indicator of just how revolutionary a machine it really is. In that light, the words of Tandy's President and Chief Executive Officer John Roach at the BCS meeting seem more than corporate puffery: "I believe this is the first in a generation of not only portable computers, but simpler computers."

"Not only do we feel that way," he added with a smile, "we know many of you do, too, because the 100 is selling exceptionally well."

Tandy President John Roach
All smiles about success of 100.

Jon Shirley
He took a parting shot at Apple before leaving Tandy for job at Microsoft.

SHIRLEY NEW CEO AT MICROSOFT

Microsoft Corporation, a major producer of software for computers, announced John Shirley, vice president of computer merchandising for the Radio Shack division of the Tandy Corporation, was elected president and chief operating officer.

According to *The Wall Street Journal*, the 45-year-old Shirley succeeds James C. Towne, who resigned as president June 20, citing a clash of management styles and goals with those of William Gates, 27, chairman of Microsoft. Shirley took the reins of Microsoft August 1.

The Journal described Microsoft as a "closely held concern." It said it has grown rapidly to become one of the most important producers of software for microcomputers. Its Microsoft Basic, the daily reported, is widely used; its MS-DOS operating system is used on the IBM personal computer.

Most of the company's growth came from licensing such products to makers of computers and computer systems, who then incorporate the software into their machines. But now, *The Journal* said, Microsoft is trying to build sales of products directly to users of computers. It plans, for example, a major advertising campaign to sell its new word-procesing software, Multi-Tool Word, which the company expects to start shipping in August.

Marketing such products is where Shirley comes in. "My commission is to manage the company's growth, with special eye to the retail-marketing side," he told *The Journal*. "Bill [Gates] wants to devote much of his time to product development and product innovation."

Almost all of Tandy's computers use software developed by Microsoft, Shirley said. Microsoft and Tandy also worked closely together in developing the TRS-80 Model 100.

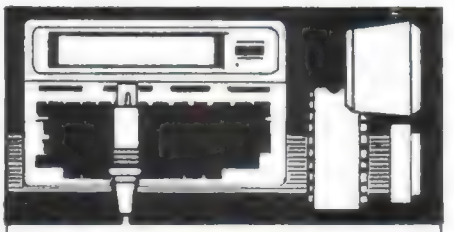
BUILD YOUR OWN NULL MODEM

An indispensible gadget for any 100 owner is a null-modem connector. Here's how to make one.

By TERRY KEPNER

To connect your Model 100 through its RS232 port to another computer, you need a device called a "null-modem connector" and an RS232 cable. A null modem (null as in none) is simply a double-DB-25 connector with certain lines crossed between them to simulate a modem between the connectors. The RS232 cable is just a length of cable with two male DB-25 connectors.

The computer-to-computer connection is very simple, since all you have to do to get the two computers "talking" is to connect the input lines of one computer to the output lines of the other and vice versa. On the Model 100, and with most other standard RS232 port computers, the pins in the DB-25 connector are assigned as shown in figure 1.



HARDWARE

CONNECTIONS. To connect two computers, just cross-connect pins 2 to 3, 4 to 5, and 6 and 20 to 8, as illustrated in figure 2. All you need are two DB-25 connectors, some wire, a soldering iron, some solder, and a little miscellaneous hardware.

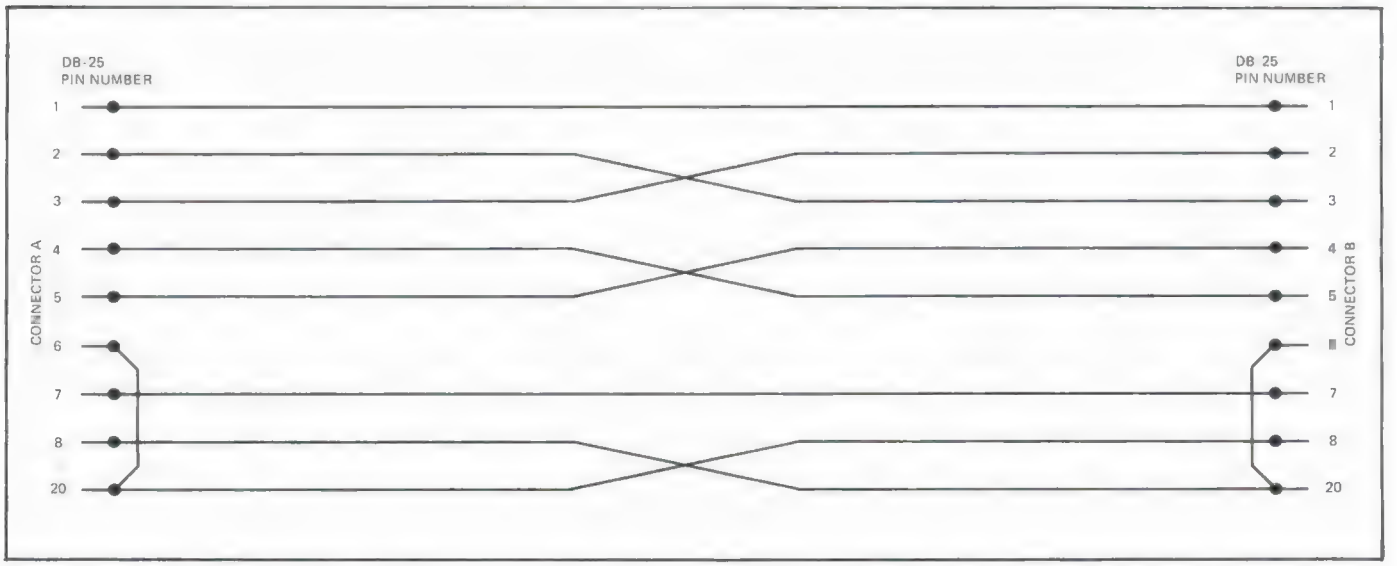
Why would you want to make one yourself? Because it's cheaper to build it (under $10) than to buy it ($29.95)! And if you don't already have an RS232 cable, it's even cheaper (Radio Shack sells a five-foot, double-male cable for $39.95) to build instead of buy.

Since there are two types of DB-25 connectors, male and female, the exact cost of your home-built null modem depends on which you decide to use. The male connector (Radio Shack catalog no. 276-1547) costs $2.99, while the female connector (276-2548) costs $3.99. Another factor is the length of cable used, and whether or not you use DB-25 hoods ($2.19 each).

HOME BREWED. Another bonus to building your own null-modem connector (with at least one male DB-25) is that it will easily fit on your Model 100; Radio Shack's null modem won't. To use the Radio Shack's null-modem connector, you have to attach the connector to the other computer's RS232, plug the extension cable into it, then plug the other end

Pin 1 Ground
Pin 2 Data Transmit Line
Pin 3 Data Receive Line
Pin 4 Request to send line
Pin 5 Clear to send line
Pin 6 Data set ready
Pin 7 Ground
Pin 8 Carrier detect (not connected on Model 100)
Pin 20 Data Terminal Ready

Figure 1.



of the extension cable into your M100. This isn't always easy or practical.

Before building your null-modem connector, you have to decide where you'll be using it the most. Normally, you'll need one male and one female connector for your null modem, but there are some situations in which you need a double-female or double male null-modem connector. For example, if you have an RS232 cable with a female connector at each end, you'll need a double-male null-modem connector. Similarly, if you want the null modem to include the extra length of wire to reach from one RS232 port to another (such as connecting two Model 100's together), you'll need a double-male null modem. Usually, you'll be using a cable attached to the other computer and connecting that cable to the null-modem connector plugged into your computer, a situation requiring a short male/female null-modem.

40-FOOT WIRE. When you've decided on your arrangement, buy the two connectors and some gauge wire. If you've decided to eliminate the need for a separate cable, buy at least eight times the length of wire you need for the distance you want to cover. That is, for a five-foot cable, you need 40 feet of wire. If your null-modem connector is only an inch or two in length (like the Radio Shack null-modem connector), you can buy two two-inch brass screws with three nuts each (total cost about 70 cents) and bolt the two connectors together to form a single unit and relieve the strain of flexing the wires. Longer lengths will require the use of the DB-25 hoods to protect the wires.

Now cut eight wires to length, and strip off about 1/8 inch of insulation from each end of each wire. To one connector, which I'll refer to as connector A, solder one wire to each of pins 1, 2, 3, 4, 5, 7, 8, and 20 (there are numbers by each pin). Then cut two short lengths, about one-inch long, and strip the ends of insulation for about an 1/8 inch.

Solder one short length of wire to pin 6 of one connector, then bend it back and solder the other end to pin 20 (pins 6 and 20 are now tied together, with a long piece of wire going from pin 20 on connector A). Repeat this with the other short wire on the other connector. Take the wire from pin 1 of connector A, and solder it to pin 1 of connector B. Similarly, solder the wire on pin 7 to pin 7 of connector B. These are the only two pins connected straight across. Solder A's pin 2 wire to B's pin 3. Solder A's pin 3 wire to B's pin 2. Similarly, across the wires from A's pins 4 and 5 to B's pins 5 and 4. Now solder A's pin 8 wire to B's pin 20, and A's pin 20 wire to B's pin 8.

If you have one, use a Volt/Ohmmeter to verify pins 1 and 7 are straight through, pins 2 and 3, 4 and 5, and 8 and 20 are cross-connected. Pins 6 should connect to pins 20 of their own connector and to pin 8 of the other connector. If you don't have an ohmmeter, take apart a flashlight and use its batteries and bulb, and extra pieces of wire, to test for complete circuits. You also want to make sure there aren't any solder bridges accidentally connecting pins that shouldn't be connected.

DB-25 HOODS. When you're finished, attach the DB-25 hoods to the DB-25 connectors. The hoods protect the wires from excessive flexing at the solder joints, and make it easier to disconnect the null modem from your computer without pulling the wires out of the null modem. If you constructed a short null modem, as I did, the screws will hold the unit together and protect the wires.

Good luck and happy transmitting.


MARKET NEWS
Business
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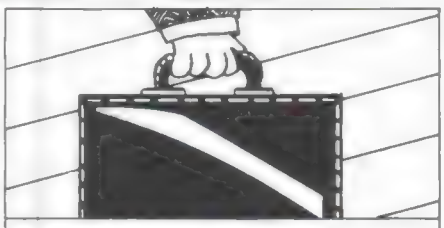
TRACK YOUR FORTUNE WITH MARKET-100

Increasing your gains and cutting your losses is a cinch with this portfolio managment program.

By EDWIN DETHLEFSEN



BUSINESS

Market-100 creates and maintains an investment portfolio and I believe, in some ways, it tops some commercial programs for the TRS-80 Models I and III.

The program maintains and updates records of stock prices by calendar dates and uses those records to create trend charts on your Model 100 screen.

Market-100 details the current status of your holdings and reports the amount of unrealized gain or loss on each one. It also summarizes each holding and screens a summary on your whole portfolio.

Using Market-100 makes it easy to distinguish winners from losers in your portfolio and make well-informed judgments about selling a security or buying more of it.

PRINTOUTS. Used in conjunction with the print feature of the Model 100, the program will produce a printout of its updates and periodic portfolio summaries.

Although Market-100 doesn't permit automatic updating of your portfolio through telecommunication with an information network like Dow Jones or CompuServe, you can use your 100 to automatically dial your broker and as he gives you the quotes for your stock, you can enter the quotes manually.

Market-100 occupies about 3.5K of random accesss memory. It will run easily in an 8K Model 100, but the gradual expansion of the files generated by the program will soon absorb all RAM in an 8K machine. So unless you have few stocks in your portfolio, an 8K 100 may contain insufficient memory for proper operation of the program.

For truly extensive use of Market-100, your 100 should contain at least 16K of RAM. However, I recommend 24K because, unless your portfolio is very lengthy, that size 100 will leave 10K to 15K for other uses. With 24K RAM, you can use your Model 100 for a variety of purposes without the chore of loading files from tape every time you want to update your portfolio.

24K SUGGESTION. My portfolio fluctuates around a dozen stocks. So far, it has about a dozen updates in each file. With all that in the RAM of my 24K machine, I still have plenty of room for address and schedule files, plus 2,000 words of correspondence, memos, and the like.

Here's how the program works. Line 70 sets dimensions for 15 stock holdings. If fewer than 11 stocks will be in the portfolio, most of line 70 [except D(18) and K(18)] can be deleted to increase working memory. The numbers in line 70 can be altered to match the maximum number of stocks in the portfolio. Similarly, if more than 18 updates are included in each file, D(n) and K(n) must be increased accordingly.

The portfolio and program occupies menu space on your 100 equal to the number of stocks in your portfolio plus two (MARKET.BA and TICKER.DO).

On initialization, Market-100 asks, "DATE (MMDDYY)?." It is important to insert the appropriate six digits here (no slashes — just the digits, including zeros). This date will be filed permanently with the current update prices. The menu will contain the options in figure 1.

Please turn the page

Continued from page 41

```
(1) Create File
(2) Update File
(3) Chart Trend/Review $$
(4) Portfolio Summary
(5) Tickers
(6) End
(7) Delete Ticker
```

Figure 1.

You're asked to enter the number from the menu representing your selection. If you select create a file (add a new stock holding to the portfolio), you're asked to enter the ticker symbol of the new holding, the cost per share, and the number of shares purchased. The program promptly establishes a new, permanent ASCII file named after the ticker symbol, and adds the new ticker symbol to the TICKER.DO file, which contains a list of the stock symbols in your portfolio. You're then prompted to return to the master menu.

COMMISSION FEES. Here are two suggestions that make Market-100 more useful as a portfolio manager. First, incorporate commission fees into the per share price of the stock. This will provide a more accurate calculation of gains and losses during subsequent updates and portfolio summaries.

Second, update a file after creating it. Then the initial cost per share and the purchase date will be recorded with the initial cost. When the stock is sold this can be important in determining the long or short term capital gains or losses without having to look up the broker's invoices.

Although Market-100 does not record sales or determine long or short term capital gains, it will contain all the necessary data for doing so, provided you've followed my suggestions.

UPDATING STOCKS. Let me show you how this segment of the program works. Let's say I just purchased 1000 shares of H&H Oil Tool (HHOT). Turning on my Model 100, I place the cursor over MARKET.BA and hit enter. I'm asked for the date. It is May 18, 1983, so I enter 051883.

The program produces a menu. I select (1) Create File and press enter.

The screen clears and "Enter ticker symbol?" appears. I type in HHOT.

I'm asked, "Enter cost/share?". With the $100 commission (I use a discount broker), I paid $7.10 per share, so I enter 7.10.

I'm now asked, "Enter # shares purchased?" I enter 1000.

The program checks my entries by asking, "You own 1000 shares HHOT. Correct? (Y/N) (Enter 'M' for Master Menu)?" I have three choices here. If my entries were correct, I enter Y. If I wish to change my entry, I enter N, and the screen returns to a request for a ticker symbol. If I have decided not to make any purchase entry, I can enter M to return to the master menu.

Assuming my entries are correct, I enter Y. The screen clears and I am informed, "File created for HHOT. Press <ENTER> to continue?"

NEW PURCHASES. Pressing enter returns me to the master menu. In order to establish the date of purchase, I choose option two, update file. We'll consider that move shortly. But first, this note: If you purchase additional lots of the same stock at a later date, a new file must be opened for each new purchase, and each lot must be updated separately.

For example, if I purchase another 1000 shares of HHOT next month, I must create a new file with a slightly different name (say, HHOT2). When updating that stock, I must enter a separate update for each file of that stock.

When you elect to update a file, you're asked to "Enter ticker for update." The file is opened for the stock, and you're asked, "Current price of [Ticker]." Enter the current price and date.

Then the program informs you of the current value of your holding, the initial amount paid per share, the current amount of unrealized gain or loss per share, and the percentage gained or lost on your original investment.

I generally call my broker once a week for update prices. With the Model 100 beside the telephone (I have it direct-connected to the phone for automatic dialing using TELCOM.), I update all my holdings at once. This is especially useful when consistency is desired for comparing the trend charts screened from item three on the master menu.

HOW HOT IS HHOT? Let's try updating HHOT. I select two from the mastermenu. The screen clears, then asks, "Enter ticker ('M' for Menu)". I enter HHOT. I am asked, "Current price of HHOT is?". I enter 7.10 again. The purchase date will automatically be recorded, and the information in figure 2 is displayed on your screen.

```
Current val of HHOT is 7100
You paid 7.1/shr
This is a gain of 0/shr
Current gain is 0%
Press <ENTER> to continue?
```

Figure 2.

Remember, however, I have entered the current ask price for reference purposes. The actual bid price for the stock is 6.50. I press enter, returning to the prompt "Enter ticker ('M' for Menu)?". Now I'm ready for an ordinary update. I enter HHOT again, responding to the current price query with 6.50. This

causes the program to screen the information in figure 3.

```
Current val of HHOT is 6500
You paid 7.1/shr
This is a loss of .6/shr
Current loss is 8%
Press <ENTER> to continue?"
```

Figure 3.

The second entry will always show a loss representing the difference between bid and ask (plus commission) prices. All future updates will require only the entry of the current ask price of your stock.

At this point I may update other stocks or return to the master menu at the next prompt.

If I want hard copy of the update figures, I turn on my printer and press the print key of my Model 100 before returning to the master menu.

TREND/REVIEW. From the master menu, you may also choose to "(3) Chart Trend/Review $$". When you select this option, the information in figure 4 appears on your screen.

```
(1) Review Dates/Prices
(2) Chart Trend
(3) Return to Master Menu.
```

Figure 4.

If you choose option one, the program asks, "Ticker symbol for price file." After you respond to that prompt, the number of shares held, initial price, and update dates and prices are screened for your review.

There is space for 16 updates on the screen before it begins scrolling the earlier entries out of sight. However, each file is accessible directly from the Model 100 menu for review and editing. Thus each file can be reviewed or edited and entries deleted to expand the time intervals between updates. Weekly entries, for example, can be changed to biweekly or monthly intervals.

CHANGING LINE 70. If price update files contain more than 18 entries, the dimensions D(18) and K(18) in line 70 must be increased. For example, suppose I want to examine all my entries for HHOT. Having entered (3) from the master menu, I now enter (1) to review dates and prices". The program asks, "Ticker symbol for price file?". I enter HHOT. The screen clears, and the information in figure 5 appears on it.

```
Date Price Date Price
051883 7.1 051883 6.5 ?
```

Figure 5.

Those are all the updates I've entered for HHOT. The ? is a prompt. I press enter and return to the master menu.

Now suppose I've had the stock for several months and made regular updates. The collective entries might look like figure 6.

```
Date Price Date Price
051883 7.1 051883 6.5
060183 6.9 061583 7.4
070183 7.1 071583 7.6
080183 8.375 081583 8.125 ?
```

Figure 6.

The review of dates and prices shows changes between various dates, the last entry being on August 15, 1983, showing a per share value of 8 1/8. For hard copy of the file, press the print key before answering the ? prompt.

CHARTING STOCKS. If you select (2) Chart Trend you're asked to enter the ticker symbol for the stock to be charted. The file for that ticker is opened and the prices are graphically charted sequentially on the Model 100 screen.

At the left side of the screen is a vertical, approximate price scale, marked in tens from 0 to 5. If the stock value is greater than $60 per share, the price is halved before it is charted.

The maximum chartable stock price is $120 per share. Stocks with prices fluctuating around $60 will create an erratic graph, since some price entries will be halved while

Please turn the page

MARKET-100 VARIABLES

String Numeric	
A$ = Ticker Symbol	A = # Shares Held
E$ = Gain or Loss"	B = Initial Cost/Share
Z$ = Program Prompt	C = Current Value of A
	D = Current Price/Share

Continued from page 43

others will not. Also, because of the Model 100's short vertical scale, stock prices below $8 a share will cause the graph to drop below the chart area.

Update entries are numbered in sequence across the bottom of the screen. If there are more than nine entries to be charted, the subsequent entries are designated with a $ symbol, up to a maximum number of 18 entries.

TIME TREND. The display of "Time Trend" screened for a particular ticker is intended only to provide a general, visual impression of the progress of that stock during update period. The numerical scale at the left of the chart is only intended to serve as an approximate guide. If the line tends to move upward towards the right side of the screen, the stock is increasing in value.

In the case of HHOT, its data would produce a practically horizontal line across the bottom of the screen, crossing the border of the chart area as it rose from $7 to $8 per share.

If you want a summary of your stocks, choose (4) Portfolio Summary. Market-100 opens each ticker file and lists shares held and profit or loss for each holding. If the screen is filled before the summary is listed, the program requests a prompt before proceeding to the next screen.

Let's return to my 1,000 shares of HHOT. In addition to them, I own 200 shares of ABC and XYZ. I bought ABC at $22.47 per share and XYZ at $45. Currently they are respectively worth $31.25 and $47.625. Entering (4) for Portfolio Summary, I would get a screen with the information in figure 7.

```
200 shares ABC show gain of
1756.00
200 shares XYZ show gain of
525.00
1000 shares HHOT show loss of –
600.00
Press <ENTER> to continue?"
```

Figure 7.

After reviewing my gains and losses, I would respond to the prompt. Market-100 then provides an overall summary, listing totals for portfolio investment, current portfolio value, and the portfolio gain and loss. For my sample case, the summary would look like figure 8.

```
Total portfolio investment =
20594.00
Total portfolio value = 22275.00
Total portfolio gain = 1681.00
Press <ENTER> to continue?"
```

Figure 6.

If, at any time, you forget your ticker symbols, select Ticker. That opens TICKER.DO and screens all the symbols for review.

When a stock is sold, its file should be deleted. Suppose I have sold my 1000 shares of HHOT. Entering (7) from the master menu, the program would respond, "Enter ticker of file to delete, Or 'M' to return to menu?" I would enter HHOT. The program would ask, "Are you sure?" Pressing N or enter would take me back to the preceding request for a ticker. Entering Y would cause the program to respond with: "HHOT FILE DELETED. Remember to delete from TICKER file!"

After a short interval, I would be returned to the master menu. Then I would exit Market-100, enter TICKER.DO, and delete HHOT from that file.

BETTER THAN S&P. Given the memory limitations of a small computer, and the graphics limitations of a small screening area, Market-100 performs the major tasks expected of any portfolio management program, and it performs several "luxury" roles as well. In spite of its small size, the chart trend function can be useful in deciding to buy or sell a stock, and the review of updates will provide whatever additional details one may need. In these respects Market-100 is superior even to the program package produced by Standard and Poor's for the TRS-80 Models I and III.

```
 6 'Market-100: A Portfolio Management Program
 7 'by Edwin Dethlefsen
 8 'Copyright (c) 1983 by Edwin Dethlefsen
 9 'Header
10 CLS
   :GOSUB200
20 PRINT "MARKET-100"
   :PRINT "A Portfolio
   Management Program
30 PRINT "by Edwin
   Dethlefsen"
   :PRINT
   :GOSUB200
40 PRINT "Copyright (c)1983 by Edwin
   Dethlefsen
50 FORI=1TO2000
   :NEXT I
55 'Input Date
60 CLS
   :INPUT "DATE(MMDDYY)";K
70 DIMA$(15),B(15),A(15),C(15),D(18),
   E$(15), K(18)
75 'Print Menu
```

*See p. 4 for an explanation of *Portable 100*'s program listing format.

```
 80 CLS
    :GOSUB200
    :PRINT "MENU:";
 90 PRINTTAB(5); "(1) Create File (6) End
100 PRINTTAB(5); "(2) Update File (7)
    Delete Ticker
110 PRINTTAB(5); "(3) Chart Trend/Review
    $$
120 PRINTTAB(5); "(4) Portfolio Summary
130 PRINTTAB(5); "(5) Tickers
135 'Get Menu Choice
140 GOSUB200
    :INPUT "ENTER CHOICE
    NUMBER";Z
150 ONZGOTO340,490,710,1130,270,160,1450
155 'End Program
160 CLS
    :END
165 'Utility Gosubs, etc.
170 CLS
    :OPEN "TICKER"FOR INPUTAS1
    :RETURN
180 OPENA$(I)FOR INPUTAS1
    :RETURN
190 INPUTZ$
    :GOTO710
195 'Print Border
200 PRINTSTRING$(39,158)
    :RETURN
205 'Prompt  & Reset
210 INPUT "Press <ENTER> to continue"; Z$
220 II=0
    :CLS
    :RETURN
225 'Calculates Values
230 C(I)=A(I)*D(I)
    :CC(I)=A(I)*B(I)
    :RETURN
235 'Calculate Totals, Determine gain/loss
240 BB=BB+CC(I)
    :DD=DD+C(I)
250 IFBB<DDTHENE$(I)= "gain"ELSEE$(I)
    = "loss"
260 RETURN
265 'Screen Ticker List
270 I=O
    :GOSUB200
    :GOSUB170
280 INPUT#1,A$(I)
290 PRINTA$(I); " ";
    :IFI=7THENPRINT
300 IFEOF(1)GOTO320
310 I=I+1
    :GOTO280
320 CLOSE
    :PRINT
    :PRINT "These are your
    current active files."
    :GOSUB200
    :GOSUB210

330 GOTO80
335 'Input Data for Stock File
340 CLS
350 GOSUB200
360 PRINTTAB(8); "Enter ticker
    symbol";
    :INPUTA$
370 PRINTTAB(8); "Enter cost/
    share";
    :INPUTB
380 PRINTTAB(8); "Enter # shares
    purchased";
    :INPUTA
390 GOSUB200
    :PRINT "You own";A;"shares
    "A$;", Correct? (Y/N)"
395 'Get and Read Prompt
400 INPUT "(Enter 'M' for Master Menu)
    ";Z$
410 IFZ$= "M"GOTO80
420 IFLEFT$(Z$,1)<> "Y"GOTO340
430 GOSUB200
435 'Create Stock File
440 OPENA$FOROUTPUTAS1
450 PRINT#1,B;A;
    :CLOSE
455 'Add to Ticker File
460 OPEN"TICKER"FORAPPENDAS1
470 PRINT#1,A$
    :CLOSE
475 'Return to Menu
480 PRINT "File created for
    ";A$
    :GOSUB200
    :GOSUB210
    :GOTO80
485 'Read Ticker List
490 I=O
    :GOSUB170
500 INPUT#1,A$(I)
510 IFEOF(1)GOTO530
520 I=I+1
    :GOTO500
530 CLOSE
535 'Get Ticker for Update
540 CLS
    :GOSUB200
    :INPUT "Enter ticker ('M'
    for Menu)";A$(I)
545 'Prompt
550 ONERRORGOTO80
560 IFA$(I)= "M"GOTO80
565 'Open & Read Stock File
570 GOSUB180
580 INPUT#1,B(I),A(I)
```

```
590 IFEOF(1)GOTO600
600 CLOSE
    :GOSUB200
605 'Get Current Price
610 CLS
    :GOSUB200
    :PRINT "Current price of
    ";A$(I);
    :INPUT " is";D(I)
620 GOSUB690
    :GOSUB230
625 'Determine Unrealized gain/loss
630 IFB(I)<D(I)THENE$= "gain"ELSEE$= "loss
640 PRINT "Current val of ";A$(I);" is";C(I)
650 PRINT "You paid";B(I);"/shr
660 PRINT "This is a";E$;" of ";D(I)-B(I);"/shr
670 PRINT "Current ";E$;" is ";INT(((D(I)
    -B(I))/B(I))*100);"%
680 GOSUB200
    :GOSUB210
    :GOTO540
685 'Add Current Price to File
690 OPENA$(I)FORAPPENDAS1
700 PRINT#1,K;D(I);
    :CLOSE RETURN
705 'Screen Chart menu
710 CLS GOSUB200
720 PRINTTAB(5);"MENU"
730 PRINTTAB(7);"(1) Review Dates/Prices
740 PRINTTAB(7);"(2) Chart Trend
750 PRINTTAB(7);"(3) Return to Master
    Menu"
    :GOSUB200
755 'Get Menu Choice
760 INPUT "Enter number of your choice";Z
770 ONZGOTO780,920,80
775 'Get Ticker Symbol
780 CLS
    :J=1
    :T=40
    :GOSUB200
790 INPUT "Ticker symbol for price
    file";A$
800 ONERRORGOTO710
805 'Read Stock File
810 CLS
    :OPENA$FORINPUTAS1
820 INPUT#1,B,A
825 'Title Screen
830 PRINT@1,"Date";PRINT@8,"Price";PRINT@2
    1,"Date";
    :PRINT@28,"Price
835 'Read & Screen Prices & Dates
840 INPUT#1,K(J),D(J)
850 PRINT@T,K(J);
860 PRINTUSING" ###.##";D(J);
870 T=T+20
    :J=J+1
880 IFEOF(1)GOTO900
890 GOTO840
900 CLOSE
905 'Prompt Menu
910 GOTO190
915 'Get Ticker
920 CLS
    :J=O
    :L=279
    :N=6
    :X=O
930 INPUT "Enter ticker symbol ('M' for
    Menu)";A$
940 IFA$= "M"GOTO710
950 'Open Stock File
950 OPENA$FORINPUTAS1
960 INPUT#1,B,A
970 'Format Chart
970 CLS
    :FORM=40TO240STEP40
    :N=N-1
980 PRINT@M,N
    :NEXTM
990 J=J+1
    :X=X+12.5
1000 PRINT@O,A$;" Time Trend
1005 'Get & Chart all Prices
1010 INPUT#1,K(J),D(J)
1020 L=L+2
1030 IFJ<THENPRINT@L,J;ELSEPRINT@L,"
    $";
1040 IFJ<2THENGOSUB1110
1050 Y=D(J)
    :IFY>60THENY=Y/2
1060 Line-(X,62-Y)
1070 IFEOF(1)GOTO1090
1080 GOTO990
1090 CLOSE
1095 'Prompt
1100 GOTO190
1105 'Chart Prices
1110 LINE(X,54)-(235,7),1,B
1120 LINE(X,54-Y)-(X,54-Y)
    :RETURN
1125 'Read Ticker File
1130 J=1
    :C=O
    :CC=O
    :BB=O
    :DD=O
    :GOSUB170
1140 INPUT#1,A$(J)
1150 IFEOF(1)GOTO1180
1160 J=J+1
1170 GOTO1140
1180 CLOSE
1185 'Open Stock File
1190 FORI=1TOJ
```

```
1200  GOSUB180
1210  INPUT#1,B(I),A(I)
1220  IFEOF(1)GOTO1250
1225  'Read all prices
1230  INPUT#1,K(I),D(I)
1240  GOTO1220
1250  CLOSE
1255  'Prompt & Calculate
1260  GOSUB230
1270  GOSUB240
1275  'Summarize gain/loss for Each Stock
1280  PRINTUSING "####";A(I)
1290  PRINT " Shares ";
1300  PRINTUSING "/#/";A$(I);
1310  PRINT "show"; E$(I); " of";
1320  PRINTUSING "####.##" ;C(I)-CC(I)
1325  ' "Full Screen" Prompt
1330  II=II+1
1340  IFII=7THENGOSUB210
1345  'Next Ticker
1350  NEXT
1355  Summarize Portfolio gain/loss
1360  GOSUB210
      :CLS
      :PRINT
      :GOSUB200
1370  PRINT "Total portfolio investment=";
1380  PRINTUSING "######.##";BB
1390  PRINT "Total portfolio value =";
1400  PRINTUSING "######.##";DD
1410  IFBB<DDTHENE$=" gain "ELSEE$=" loss"
1420  PRINT "Total portfolio";E$;" =";
1430  PRINTUSING "######.##";DD-BB
1435  'Prompt
1440  GOSUB200
      :GOSUB210
      :GOTO80
1445  :Get File Name
1450  CLS
      :GOSUB200
      :PRINT "Enter ticker of
      file to delete,
1460  INPUT "or 'M' to return to menu";A$
1470  ONERRORGOTO1450
1475  'Check File Name
1480  IFA$="M"GOTO80
1490  INPUT "Are you sure";Z$
1500  IFLEFT$(Z$,1)<>"Y"GOTO1450
1505  'Kill Stock File
1510  A$=A$+ ",DO
1520  KILL A$
      :PRINTA$; "FILE DELETED"
1525  'Reminder & Return
1530  PRINT "Remember to delete from
      TICKER file!
1540  FORI=1TO1500
      :NEXT
      :GOTO80
```

TOOLING THE NETWORK NATION IN YOUR SNAZZY 100

Before you road test your 100 on CompuServe's SIGs, take a driving lesson from these veteran sysops.

By CHARLES BOWEN and STEWART SCHNEIDER

Of all the computers accessing the popular computer data bases these days, your new Model 100 is a snazzy little sports car on the roads of the Network Nation.

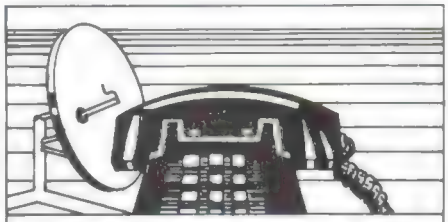
Using TELCOM and TEXT, you can save connect time by writing your messages off line, then uploading them to the message boards. The download capabilities allow you to capture and save text files and programs for use when you're off line.

NEW FRONTIER. CompuServe offers some 50 different special interest groups (SIGs), including one designated for people interested in the Model 100. There's not enough space here to tell you everything about using the SIGs. If you want more information, we suggest you order CompuServe's 30-page SIG Reference Manual. It costs about $6 from the FEEDBACK section and is a valuable pamphlet to have on your knee when you're exploring this new frontier.

What we'd like to do here is take up several of the more common questions Model 100 owners ask about SIGs:

- How do I change my line length so the display fits my 40-character screen?
- How can I upload messages to SIG bulletin boards?
- How can I download programs to my Mod 100?

WHAT YOU SEE. First, the line lengths... The first time you visit a SIG, you'll be greeted by this list of options, called the function menu (see figure 1).



COMMUNICATIONS

```
Model 100 Forum Function Menu:
1  (L)  Leave a message
2  (R)  Read messages
3  (RN) Read new messages
4  (RM) Read waiting messages
5  (B)  Read bulletins
6  (CO) Online conference
8  (MI) How to join this SIG
9  (OP) Change your SIG options
0  (E)  Exit from this SIG
Enter selection or H for help:
```

Figure 1.

Item nine on the function menu allows you to change your user options. Select it and the system will display the user options menu (see figure 2.)

```
Model 100 Forum Function Menu:
1  Change to command mode
2  (LL) Change line length
3  (T)  Return to Function menu
0  (P)  Make options permanent
Enter selection or H for help:
```

Figure 2.

Here choose option two. The system will report what the current default is and ask for the new default. Here enter 40, and you're in business.

Option zero will make this change permanent, meaning the line length for you in this SIG will be 40 characters every time you visit or until you change it again. Item three on the menu will take you back to the function menu.

UPLOADING MESSAGES. A major part of any SIG is the message board. With your new 100, you can write your messages off line and then transmit them to the SIG's boards.

With TEXT, you create your message, being careful *not* to start the message with a carriage return as the first line. (To CompuServe, a blank line signals the end of the message, so the place for that carriage return is at the end of the message.)

If you have several messages to post, write each as a separate file and note its name. Now you can log on, go to a SIG, and select option one (Leave message) from the function menu.

The system will ask you to whom you wish to write. (You may type "All" if you're addressing the entire membership. If you want to write to a specific number, remember to include his or her user ID number after the name.) Next, the system will ask you for the subject of the message.

After you've answered these questions, the system will respond as in figure 3.

```
Enter your message.
Use a blank line or control-Z to
end message.
1:
```

Figure 3.

At this point, tap upload (F3) on your Model 100. The machine will ask for the name of the file you wish to upload. After that, it will ask for the file's line width. Enter 40. Now the machine will begin transmitting.

Don't panic if sometimes the line numbers appear in the middle of lines and lines break in odd places. The message is coming through fine. And just to be sure, after the Model 100 finishes transmission, you'll have a chance to reread the message before it's posted.

When the Model 100 comes to the end of the message, it will automatically exit the upload mode. If you re-

membered to end your message with a carriage return on a line by itself, the system will close the message and display your leave options (see figure 4).

```
Leave options:
1 (S) Store the message
2 (L) List the message
3 (R) Replace a line
4 (D) Delete a line
5 (C) Continue entering text
6 (A) Abort the leave function
Enter selection or H for help:
```

Figure 4.

Option one will place the message on the board. Option two will let you reread it first. Options three through five are editing functions and option six aborts the message. Incidentally, if you forgot to end your message with a carriage return, no problem. After the transmission is finished and the Model 100 exits upload mode, just tap enter and the leave menu will be displayed.

DOWNLOADING. The data bases in the SIGs contain some programs and text files you'll probably like to have in your computer. Here you can use the download feature.

First, to get to the data bases, enter XA at the function prompt (Function: or Enter selection or H for help:). The system will ask you which of the data bases you'd like to enter. After you make your choice, the system will give this prompt—Sig/Access.

The main things you are likely to want to do in Access are either catalog, read, or download files.

The CAT command (typing, CAT <enter> at the SIG/ACCESS prompt) will list the names of all the files in the data base. But that's not very helpful, really, since file names can be only six letters. It's easier to catalog the files on keywords, descriptions, or both.

For example, suppose you wanted to see if the XA data base contains any game programs. You could enter at the Sig/Access prompt: CAT/KEY:GAME. This would say: Show me the names of all files with the keyword "game."

In addition, you can add /DES to your catalog command (CAT /KEY: GAME/DES) and get a description of the files.

After you've gotten the list of files, you'll want to read them. To do that, enter TYP at the Sig/Access prompt followed by the complete file name. The report will begin scrolling on your screen.

ACTIVATING F2. If you also want the file to go into the memory of your Model 100, you'll need to activate TELCOM's download function before you start the display.

For example, suppose using the CAT command you found in one of the XA data bases a Basic program called ALARM.100 you wanted in your Model 100. At the Sig/Access prompt, enter TYP ALARM.100, but *before* you hit the enter key, tap F2 (Download) on your Model 100. The machine then prompts you to name the file for downloading. After naming the file, hit enter. That causes the word down to be highlighted in reverse video on your Model 100 screen.

Meanwhile, back at CompuServe, the system is still waiting for the enter after TYP ALARM.100D, so tap enter again. The file ALARM.100 will begin to scroll across your screen and into the memory of your Model 100.

When you come to the end of the file, you'll receive the Sig/Access prompt again. Notice you're still in download. Tap F2 to exit.

TURNING TEXT TO BASIC. Okay, now you've got the file in your machine. How do you turn it into a Basic program? After all, you can't run a .DO file.

After you're off line, move your cursor over ALARM.DO and open the file by pressing enter. Check the program for inappropriate line feeds. Using F7 (Select) highlight all the lines of the program. Then hit F6 (Cut). Now exit (F8) ALARM.DO and go to Basic.

In Basic, type NEW to clean out the Basic buffer. Then at the OK prompt, tap the paste key. This will put down all the lines of programming you selected from ALARM.DO. After all the lines have been pasted, tap F3 (Save) and save the program with a .BA extension.

Charles Bowen and Stew Schneider have been sysops of a CompuServe SIG for more than a year. They also run Saturday Software.

DAVID BUSCH

BUSCH LEAGUE

A MAZE WITH A DIFFERENT TWIST

Editor's Note: Dave's columns are based on Break Time: 25 Games for Your TRS-80 Model 100 *a book he is preparing. Although he has written nearly 300 articles on computer-oriented topics in the last nine years, Dave is probably best known as the creator of the fictitious "Kitchen Table, Inc." Word has it the KTI crew is hard at work developing a telecommunications program for the Model 100 having nearly all the features of TELCOM.*

We all know the Model 100 is an excellent business machine, and it is being purchased by hardworking executives who write memos, schedule appointments, or communicate orders with the home office. However, those of us deeply immersed in the business computer field also know what those executives do in their time — they play games.

On one of my first visits to a regional sales office of a major mainframe computer manufacturer in 1974, I found the sales manager hunched over a terminal of a $100,000 computer — playing Othello. And, we all know what computer scientists in the 1960's (and beyond) did with their state-of-the-art equipment. They played Space War, of course. So, even though the Model 100 is being touted as a "Micro Executive Work Station", it is not *all* work. It can be a pretty fair games machine and is not limited to "word" games with no graphics.

ACTION GAME. "Invisible Maze" is a rudimentary action-oriented race against time to complete a maze. The interesting part is the maze cannot be seen. The player must use the arrow keys to maneuver blindly, progressing from the left side of the liquid crystal screen to the right in the minimum time possible.

Those easily-frustrated can breathe comfortably. By pressing D, the maze will be displayed briefly. Those with near-photographic memories can improve their recollections of the display by placing the Model 100 near a photograph. The truly chicken can cancel the quest by typing Q.

In order to satisfy the desires of everyone, I have even included a sneaky way to cheat. Those who cannot resist the urge to do something immoral can make their way to the "You win!!" prompt without wending through the maze. I won't be telling you what that is, however.

Those who insist on learning something can also benefit from this program. I firmly believe the best way of learning any Basic inside out is by typing in programs and then spend a few weeks trying to get them to work.

IRRESISTIBLE URGE. While Invisible Maze works perfectly well in my Model 100, experience has shown me that microcomputer buffs cannot resist the urge to make a few changes as they type. Some like to change the name of a variable in most of the places where it occurs. Others like to generate errors by confusing numbers and letters. After all, who in their right mind would think that P=1 is correct, when P=l (lowercase L) looks almost the same. For the more meticulous scholars, the explanation of the program which follows should satisfy your educational needs.

Like most graphic games, Invisible Maze has a requirement for detecting a collision between the cursor and one of the barriers set on the screen. In other computer systems, this is most commonly done by PEEKing at video memory locations to see if something is stored at the position the cursor will move to next. If so, a collision is deemed to have taken place.

The Model 100, on the other hand, doesn't have a video screen. I'll leave whether or not you can PEEK to see what is on the screen to a different column. (The impatient can try PEEKing from –512 to –192 to see what happens.) It would not be advantageous to detect collisions in this manner anyway, because we hope to keep the maze invisible.

Instead, we set up an array simulating video memory, with 320 elements to account for each of the 320 PRINT @ allocations.

A value of one is given any position occupied by a maze block. As the cursor moves throughout the maze, it is simply a matter of checking MZ(n) to see if the next position to be moved to is a one or a zero. If so, the movement is blocked.

PRINTING THE MAZE. That strategy makes it easy to temporarily print out the maze as well. A FOR-NEXT loop from 1 to 320 prints a graphics block (CHR$(239)) at any position that shows a one in the MZ(n).

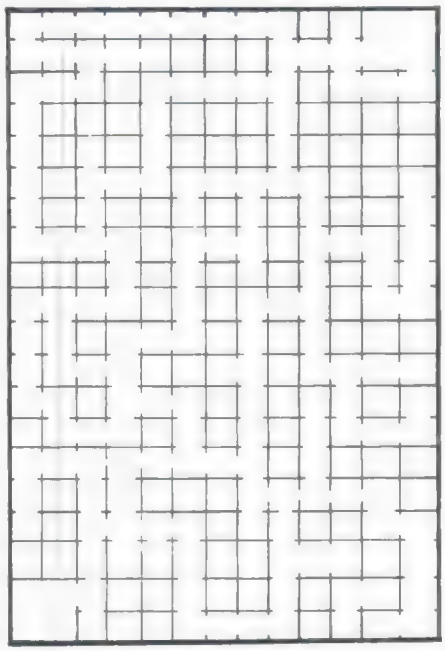
Let's take a closer look at the program. The instructions are printed from line 80–220. The player enters the number of walls desired, beginning at line 230. A number between one and nine is entered, and multiplied by 10 to produce 10–90 walls in the maze. Any more than 90 walls,

and odds are the maze will be unsolvable.

Since the Model 100 generates only pseudo-random numbers, games that must be different each time require setting a different random number starting point. The most common way of ensuring a random starting point is to use the current seconds from TIME$. A FOR-NEXT loop from one to the number of seconds feed dummy random numbers to DU, just to "use" them up, and starts the program from the next position following the last dummy random number.

While the number series is the same, sometimes we will start from position number one, other times from position number 59, or somewhere in between.

SETTING THE MAZE. Beginning at line 330, the maze is set up. A FOR-NEXT loop from one to NB (the number of blocks selected) chooses a random number. If that number has already been chosen (line 350), another number is selected. The MZ(n) element of each new number



is set to a value of one. So, if 50 blocks are set, there will be 50 scattered throughout MZ(n), while the other 270 elements remain zeros.

The starting time, P$, is taken in line 390, to be used as a measurement of elapsed time to complete the maze. Then, an INKEY$ loop repeats in line 410 until the player pushes a D, to display the maze, Q to quit, or one of the arrow keys (CHR$(28) through CHR$(31)).

Subroutines at lines 500, 540, 580, and 620 check to see if the cursor is being moved off the screen, erase the old cursor, and return control to the main routine. There, a check is made to see if the cursor position, B1 is evenly divisible by 40, (using the MOD function). If so, the right side of the screen has been reached, and an appropriate message, along with elapsed time, is displayed.

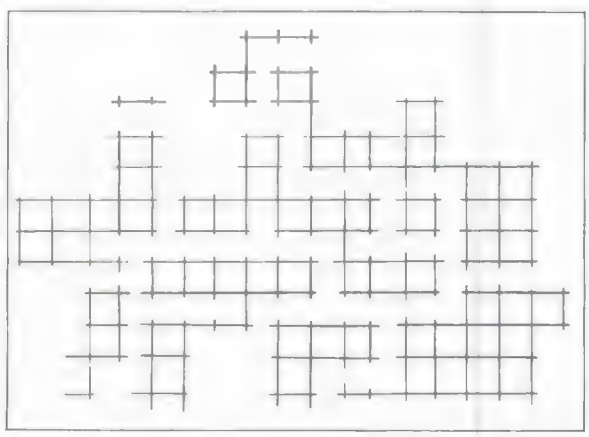
That's about it. And no, I am not going to tell you how to cheat. That would be cheating.

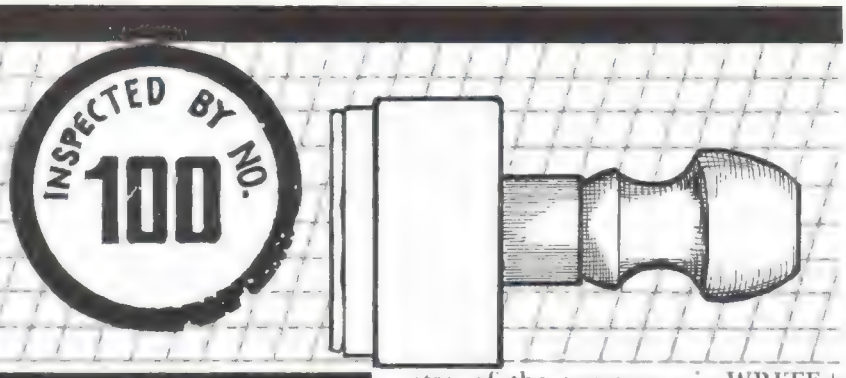
```
10 ' ********************
20 ' *                  *
30 ' *  Invisible Maze  *
40 ' *                  *
50 ' ********************
60 '
70 DIM MZ(320)
80 X=239
85 '*** Instructions ***
90 CLS
   :PRINT
100 PRINTTAB(2)"Invisible Maze"
110 PRINT
   :PRINTTAB(2)"Do you want
   instructions?"
120 PRINT
   :PRINTTAB(8)"(Y/N)
130 A$=INKEY$
   :IF A$=""GOTO 130
140 IF A$="Y" OR A$="y" GOTO 160
150 GOTO 230
160 CLS
   :PRINT
   :PRINT
170 PRINTTAB(8)"== Invisible Maze =="
180 PRINT
   :PRINTTAB(2)"Use arrow keys to
   move cursor to"
190 PRINTTAB(2)"right side of screen.
   To peek at"
200 PRINTTAB(2)"Maze, hit ";CHR$(34)
   ;"D";CHR$(34);" key. Hit ";CHR$(34)
   ;"Q";CHR$(34)" to quit."
210 PRINT
   :PRINTTAB(6)"== Hit any key to
   pla y =="
220 A$=INKEY$
   :IF A$=""GOTO 220
225 ' *** Enter number of "walls"
   desired ***
230 CLS
   :PRINT
   :PRINT
240 PRINTTAB(2)"Enter difficulty
   level:"
   :PRINT
250 PRINTTAB(2)"[1] (Easy) though [9] (
   Hard)"
260 A$=INKEY$
   :IF A$="" GOTO 260
270 NB=VAL(A$)*10
280 CLS
   :PRINT@90,"Preparing maze."
290 PRINT@130,"Hold on."
295 ' *** Set random seed ***
300 FOR N=1 TO VAL(RIGHT$(TIME$,2))
310 DU=RND(1)
320 NEXT N
```

*See p. 4 for an explanation of *Portable 100*'s program listing format.

```
325 ' *** Set up Maze ***
330 FOR N=1 TO NB
340 P=INT(RND(1)*320)
350 IF MZ(P)=1 GOTO 340
360 MZ(P)=1
370 NEXT N
380 CLS
390 B1=1
    :P$=TIME$
400 PRINT@B1,"*";
405 ' *** Check for keyboard input ***
410 A$=INKEY$
    :IF A$=""GOTO 410
420 IF A$="D" OR A$="d" GOTO 660
430 IF A$="Q" OR A$="q" THEN RUN
440 A=ASC(A$)
450 IF A<28 OR A>31 GOTO 410
460 ON A-27 GOTO 500,540,580,620
465 ' *** If Right Side of Screen ***
470 IF B1 MOD 40=0 THEN GOTO 730
480 PRINT @B1,"*";
490 GOSUB 870
    :GOTO 410
495 ' *** Cursor Right ***
500 IF MZ(B1+1)=1THEN GOSUB 890
    :GOTO 410
510 B1=B1+1
    :IF B1+1>320 THEN B1=320
520 PRINT @B1-1," ";
530 GOTO 470
535 ' *** Cursor Left ***
540 IF MZ(B1-1)=1THENGOSUB 890
    :GOTO 410
550 B1=B1-1
    :IF B1<1 THEN B1=1
560 PRINT@B1+1," ";
570 GOTO 470
575 ' *** Cursor Up ***
580 B1=B1-40
    :IF B1<1 THEN B1=B1+40
    :GOTO 470
590 IF MZ(B1)=1 THEN B1=B1+40
    :GOSUB
890 :GOTO 410
600 PRINT@B1+40," ";
610 GOTO 470
615 ' *** Cursor Down ***
620 B1=B1+40
    :IF B1>320 THEN B1=B1-
    40
    :GOTO 470
630 IF MZ(B1)=1 THEN B1=B1-40
    :GOSUB 890
    :GOTO 410
```

```
640 PRINT @B1-40,"";
650 GOTO 470
655 ' *** Display Maze ***
660 FOR N=1 TO 317
670 IF MZ(N)=1 THEN PRINT@N,CHR$(X);
680 NEXT N
690 A$=INKEY$
    :IF A$=""GOTO 690
700 CLS
710 PRINT@B1,"*";
720 GOTO 410
725 ' *** Game Won ***
730 PRINT@131,"== You win!!! =="
740 SM=VAL(MID$(P$,4,2))
750 SS=VAL(RIGHT$(P$,2))
760 SH=VAL(LEFT$(P$,2))
770 FH=VAL(LEFT$(TIME$,2))
780 FM=VAL(MID$(TIME$,4,2))
790 FS=VAL(RIGHT$(TIME$,2))
800 IF SH>FH THEN FM=FM+60
810 IF SM>FM THEN FS=FS+60
820 DS=FS-SS
    :DM=FM-SM
830 PRINT
    :PRINTTAB(2)"IT TOOK YOU ";DM;"
    MIN. AND ";DS;
840 PRINT " SECONDS TO FINISH."
850 A$=INKEY$
    :IFA$<>""THEN850
855 A$=INKEY$
    :IFA$=""THENGOTO855
860 RUN
865 ' *** Sound Routine ***
870 SOUND 12000,2
880 RETURN
885 ' *** Collision Sound ***
890 FOR Q=1 TO 10
900 Z=RND(1)*14000
910 SOUND Z,2
920 NEXT Q
930 RETURN
```





MAJOR LEAGUE TEXT PROCESSING FOR MODEL 100

The Businesspak+ Write+ Program
Portable Computer Support Group
11035 Harry Hines Blvd. No. 207
Dallas, TX 75229, (214)-351-0564
One of six programs sold as a package for $89.95

By JOHN P. MELLO JR.

You've bought a Model 100, and you find it impossible to control that smile on your face. Isn't this machine something? Then you go to print a text file and the limitations of lap computing hit you. Look at all that unformatted text drooling down your tractor-feed paper.

Take heart. A software outfit from the land of Tandy (that's Texas for all you tenderfoots) has bundled six offerings into a package called Businesspak+. And among them is Write+, a program that gives your Model 100 real formatting power.

VIVA LA DIFFERENCE. With Write+, you create and edit .DO files the way you've always done. The difference comes when you're printing the file.

The Businesspak+ program lets you:

- Center headings and text;
- Justify right margins;
- Print multiple copies;
- Number pages;
- Use headers and footers;
- Pause between pages;
- Print at a page width up to 132 columns; and
- Imbed printer codes for underlining and the like.

Write+'s documentation is clear and actually interesting to read, especially the sections on cassette loading, handling, and management. Even a veteran like myself, grizzled by untold bad loads, could find some useful tips on stabilizing the wacky world of c-loads.

SEARCH AND REPLACE The program docs also offer a technique for using the 100's select, paste, and delete functions as a makeshift search and replace feature while in text mode.

One place where the docs falter is in describing headers. The documentation claims multi-line headers can be used. After repeated attempts and a call to the Portable Computer Support Group, I found this was incorrect. The program will support multi-line headers if you're using a Radio Shack DMP-100 printer, but in most instances, those headers will not be supported by the program.

The writing program takes up three file names and about 4K of random access memory. The mainstay of the programs is WRITE+.BA (3501 bytes). The formatting menu is kept in W+SPEC.DO (494 bytes). And a command file, CORTNS.CO (166 bytes), is also needed to run the word-processing package.

Items like margins, justification, and centering, can be set in the boilerplate W+SPEC.DO file, but they also can be set within the text using dot commands, a technique found in Newscript, a word-processing program from Prosoft of North Hollywood, CA.

If you want to center a line of text you would put .c at the beginning of a line by itself. Write+ would center every line of text following .c until it saw a .n (also on a line by itself), the command to return to normal formatting. Your printer won't print the dot commands and remove inappropriate spaces caused by them.

COMPUTER FOOLED. Apparently, however, the program gets confused by text that accidentally simulates dot commands. While writing this month's new products section, a line of text broke at a reference to a .DO file. That generated an error message and a lost line of text. That error, once discovered, could be avoided by recasting the sentence or inserting a space before the .DO reference.

Since I use Newscript, I found the dot commands easy to use. But it might take some getting used to for the novice. Once you start imbedding commands, the screen text begins to stray from the printed text. That can be confusing to people who are used to the "what you see is what you get" school of word processors.

Imbedding commands gives you the ability to change formats anywhere you want to in the text. Some passages may be single-spaced, others double. You can change your

Please turn to page 56

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Continued from page 54

left and right margins to inset quoted material. By changing just your left margin, you can have an outline effect. Through this technique, Write+ gives you total control of your printed output.

PRINTER CODES. Not only can you imbed formatting codes, but you can imbed printer codes as well. The Model 100 manual (page 60) explains how to do this using the command SAVE TO:LPT. Write+ does that automatically, so you can imbed printer codes in your text.

The Write+ manual explains how to use these codes with "two common printers" — the Radio Shack DMP-100 and Smith Corona TP-1 daisy wheel. Epson owners, I guess we weren't common enough for the Businesspak+ folks.

And for those of you experimenting with formatting programs in plodding Basic, Write+ will surprise you. It is fast!

Write+ is a worthwhile addition to anyone's Model 100 library. In fact, it's probably a necessity.

KING OF SILICON HILL THREATENED

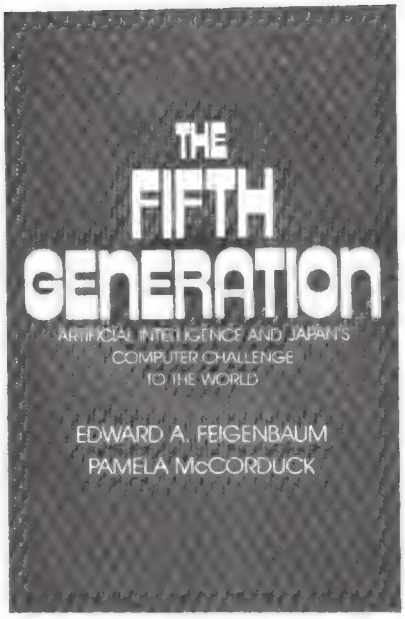
The Fifth Generation: Artificial Intelligence and Japan's Computer Challenge to the World
Edward A. Feigenbaum and Pamela McCorduck
Addison-Wesley Publishing Company
275 pages, $15.95 hardbound

By CARL CRAMER

The captivating premise in this book is that Japan is presently embarked on a government-supported campaign to develop the so-called Fifth Generation of computers.

The Fifth Generation refers to the perfection of computer capabilities in the sphere of artificial intelligence — the development of expert systems and knowledge engineering, of machines that reason and use "common sense."

This is the the Japanese challenge for the 1990's. And although this book may read like fiction, the authors are convincing in their arguments.



ANNOYINGLY ALIENATING. In this important (but frequently self-aggrandizing and, thus, annoyingly alienating) treatise, Feigenbaum and McCorduck trace the roots of their fears to the 1981 International Conference on Fifth Generation Computer Systems held in Tokyo. There, the Japanese unveiled plans for the development of knowledge information processing systems, machines rendering today's Crays and Cybers obsolete.

With financial backing of the Japanese government's Ministry of International Trade and Industry, such a development would make Japan's economic future secure through the 1990's, when knowledge-broking becomes the requisite commodity for global financial domination.

America is complacent, Feigenbaum and McCorduck proclaim. To continue this myopic attitude will result in our economic downfall, as the Japanese do for knowledge processing what they have already accomplished in the fields of subcompact automobiles and electronic semiconductors.

At times resembling a Pentagonian "worst case" scenario, this book nonetheless appears to have accomplished its authors' aims: The United States Activities Board of the IEEE has (since the book's publication) formed a committee of scientific advisors to determine the extent of the Japanese threat and whether the United States government should intervene to protect U.S. super-computer supremacy. Results of that study should be released this fall.

EXPERT AUTHORS. The authors' expertise in the knowledge-engineering industries is legion: Feigenbaum is Professor of Computer Science at Stanford University and well-versed in the roots of artificial intelligence; McCorduck has written extensively about the subject. They combine to give a gripping, almost paranoid — yet uniquely persuasive — vision of the Japanese ascent to computer dominance in the near-future.

The scene they depict bodes ill for American economic nationalism: the best and the brightest of Japanese engineers, sequestered in a no-holds-barred environment, searching for perfection; machines combining "expert" knowledge with "heuristic" (common sense) reasoning on an order of magnitude far superior to the weather-forecasting and medical-diagnosing machines we know today; machines responding to vocal and visual instructions; machines that "think."

It is not too far-fetched a premise. It may be a crap shoot, but one which, the authors cry, America can ill-afford to ignore.

LYRICAL TO PEDANTIC. Parts of this book border on the lyrical; others, on the pedantic. Regardless, it represents a labor of love on behalf of the authors: Their concern and good intentions seem beyond question. Whether or not one accepts their premise, *The Fifth Generation* deserves utmost scrutiny.

Moreover, Feigenbaum and McCorduck query rhetorically: Can we afford to ignore a well-researched, persuasive argument which posits that we are individually strong but collectively in peril?

Let us praise the altruistic elements in the book's theme and overlook its several stylistic faults (e.g. the constant injection of the heroic figure "Feigenbaum," so pretentious in its casting as to make the character mythic, ubiquitous, and damnably soothsaying). I am grateful our government has taken this book seriously.

If only as a reaffirmation of the hackneyed phrase "United we stand, divided we fall," *The Fifth Generation* deserves our undivided attention.

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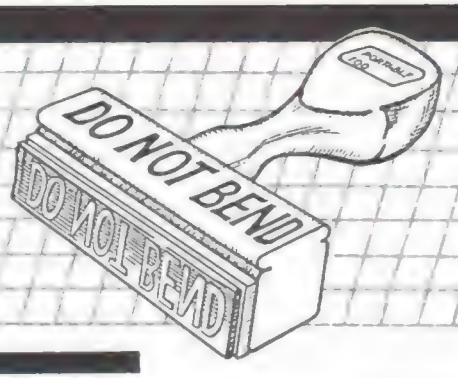


HOT SHEET REVEALS INNER WORKINGS OF 100

Paul Weiner and Gary Camp have put together a "hot sheet" of information on the Model 100. The 10-page document sells for $15 and is published by IJG, 1953 West 11th St., Upland, CA 91786.

The hot sheet includes information on the 100's input-output chip, the 8155; a partial memory map; and other items of interest for Model 100 owners.

PRINT, SORT, OTHERS FROM OREGON FIRM

Micro Computer Services, 1637, North Jantzen, Portland, OR 97217, is offering six programs for the Model 100.

Print, selling for $39.95, lets you control a document's line length, margins, and page size. It also features automatic centering.

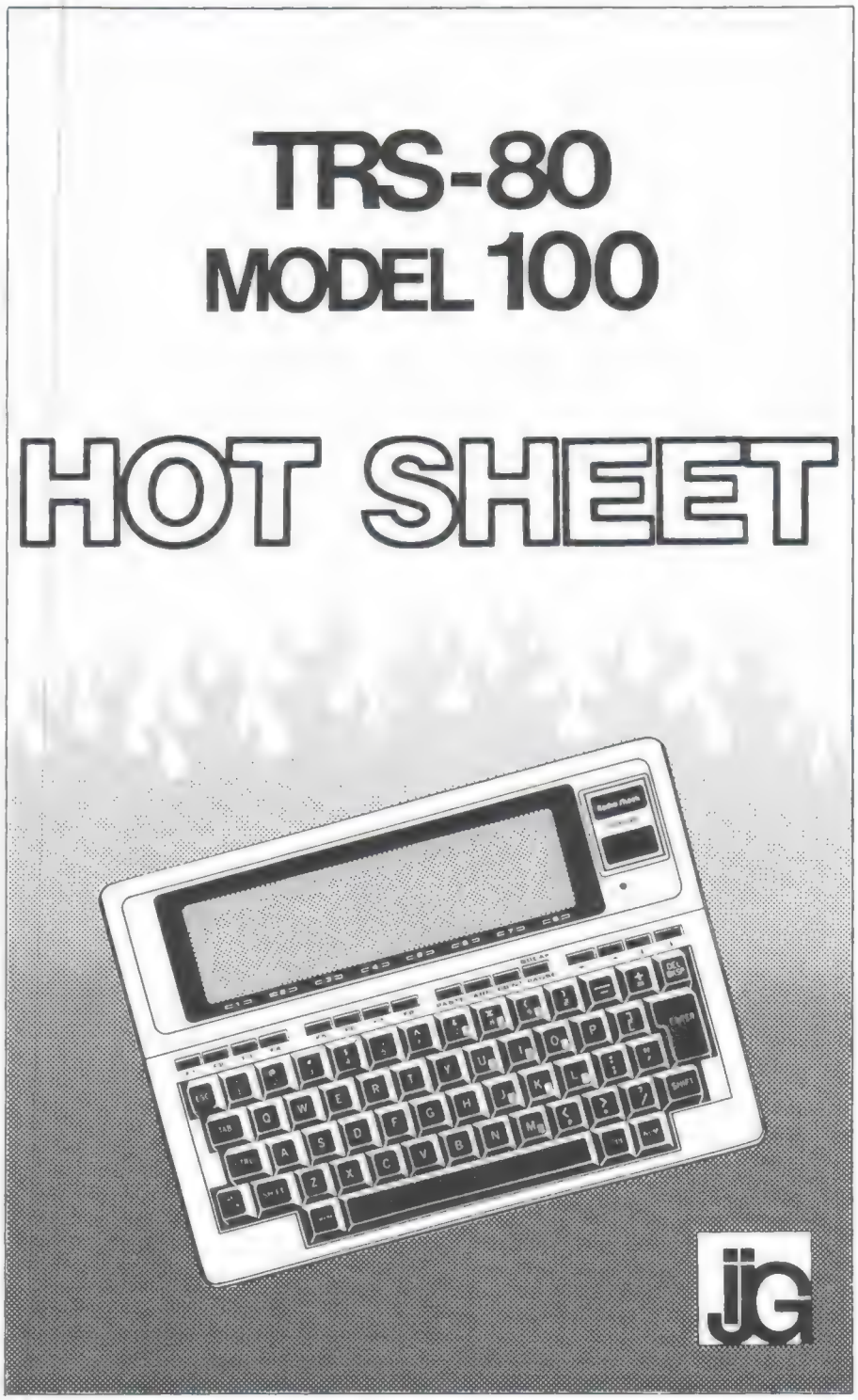
Sort will sort text files alphabetically or numerically. It sells for $29.95.

Auto Stock is geared toward Dow Jones News Service users. With this $19.95 program, you can preset your 100 to dial Dow Jones at a given time, collect stock quotes for you, store them in a file, and log off the system.

Size, priced at $14.95, counts the lines and bytes in a .DO file for you.

Alarm reminds you to keep important appointments. The $14.95 clock program lets you control two 24-hour alarm settings.

Micro Computer Services' game offering is Animal. You think of an animal and your 100, through a series of questions, will try to guess what it is. Animal sells for $11.95.



SPREADSHEET INCLUDED IN PORTA SERIES

Six programs for the Model 100 have been released by Skyline Software, 442 Sunnyside, Wheaton, IL 60187. The programs include:

PortaCalc, a 15-column-by-26-row spreadsheet. The program makes full use of the 100's function keys to save, load, screen print, report print, or look at the formulas behind the data. Full arithmetic operators are supported, including exponentiation, absolute value, integer, summation, and averaging. Calculations are done to 14 digit precision with nine digits displayed. You may also create DIF files for use with Visicalc.

PortaStat lets you do correlation and regression analysis. It's also interactive with Portacalc.

Loan and investment problems can be addressed with PortaFin. It allows you to calculate present value, net present value, future value, annuities, interest factors, load factors, internal rate of return, and more.

PortaMax lets you find the optimum mix of constraints using the powerful simplex method of linear programming.

For physicians, Skyline is offering PortaMed, an electronic clipboard to keep patient records and generate patient reports.

PortaFolio allows you to determine stock and bond valuation, Macaulay's duration, yield to maturity, bond swap calculations and more.

Skyline is offering PortaCalc for $69.95. The other programs cost $44.95 each.

BAR-CODE WAND OFFERED BY BT ENTERPRISES

For $279.95 you can tap the bar code capabilities of your Model 100.

The Bi-Tech bar code reader is produced by BT Enterprises, 10 Carlough Rd., Bohemia, NY 11716. It is designed to read all common bar code formats.

The Bi-Tech wand has an optical sensor with a 700 nm light source, photo integrated circuit detector, and precision aspheric optics.

Equipped with a push-to-read switch to minimize power consumption, the wand also has internal metal shielding to minimize its susceptibility to electromagnetic interference and electrostatic discharge.

MODEMS NOW PROTECTED FROM POWER SURGES

Electronic Specialists, Inc., 171 S. Main St., Natick, MA 01760, has developed a modem protection system.

Kleen Line Security systems are available for standard 4-pin telephone modular connectors as well as 8-pin connectors. Both models suppress spikes caused by lightning, spherics, or phone office switch gear. An isolated ground protects equipment from discharge current.

The PDS-11, for standard 4-pin telephones, sells for $56.95.

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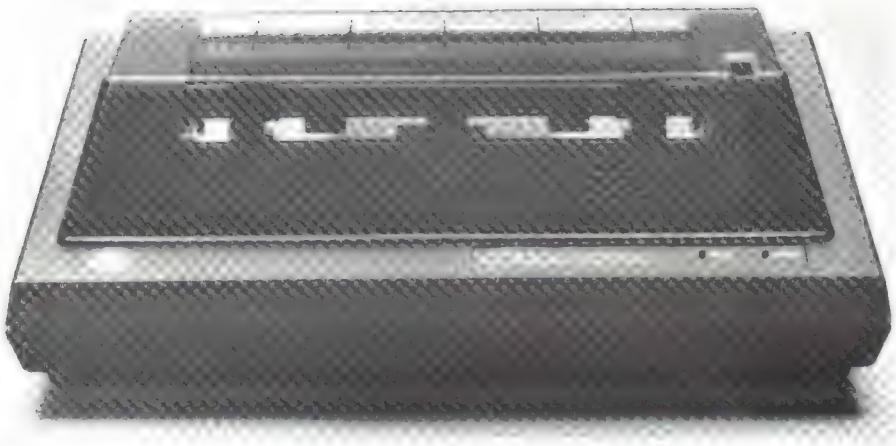


GO BANANAS OVER NEW LOW-COST PRINTER

Leading Edge wants you to go bananas over their new printer. The $249.95 dot-matrix Banana is the first offering from the company's Gorilla line.

This 80-column tractor-feed printer can produce alphanumerics or graphics on fanfold forms from 4 1/2 to 10 inches wide.

Print speed is 50 cps.

Characters are composed from a 5-by-7 matrix. Normal character spacing is 10 characters per inch. Double-width characters are available under software control.

Line spacing in letter mode is six lines per inch.

Character sets include United States, United Kingdom, German, and Swedish, selectable by software command or dip switch.

The printer also features a dot-addressable graphics mode, with a density of 63-by-60 dots per inch.

A Centronics-type parallel interface is included on the compact printer (16-by-5-by-8 and only 12 pounds).

BUSINESSPAK+ MAKES 100 BETTER MICRO

The Portable Computer Support Group, 11035 Harry Hines Blvd., No. 207, Dallas, TX 75229, has bundled seven programs in its Businesspak+.

The $89.95 package includes programs for word-processing, spreadsheet analysis, graphs, Telex communications, and listing and sorting information.

The word-processing program allows you to set top, bottom, left, and right margins; headers and footers; page numbers; and imbed printing and formatting codes.

The 18-column spreadsheet lets you store 12-days' expenses, giving you the daily and categorical totals. The row and column names can be changed instantly and all the math is built in.

With Businesspak+'s graph package, you can print bar, line, and pie charts of any expense report on the DMP-100 printer.

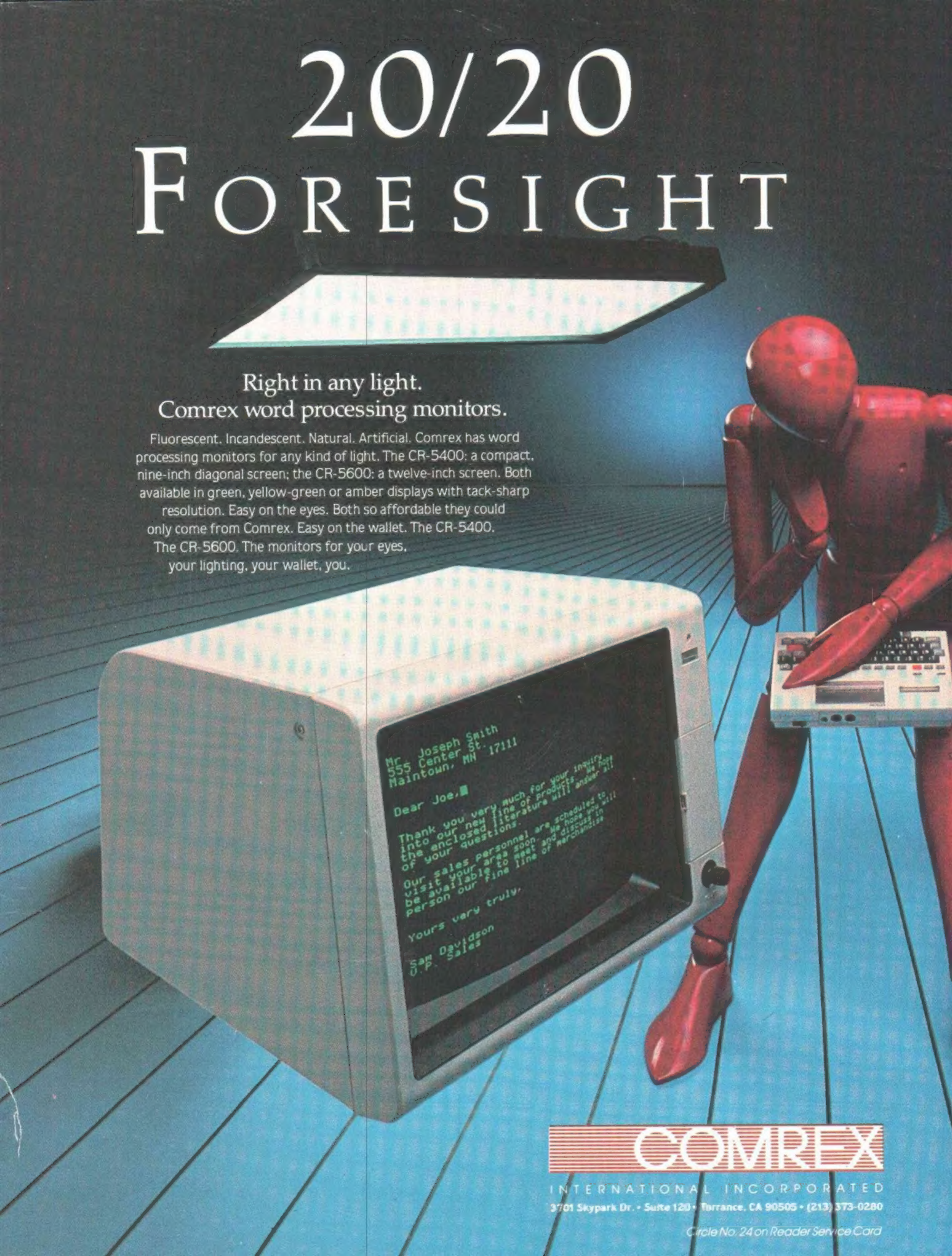
The Telex program allows you to send text files to any Telex machine in the world or mailgrams for next day delivery.

With list, you can put items together in an organized fashion, creating address, schedule, or inventory items. You can sort those items numerically or alphabetically with Businesspak+'s sort program.

FOR THOSE WEDDED TO HARD COPY

The 1984 Computer Desk Diary from Workman Publishing Company highlights each week of the year with notable dates and events in computer history. More than 50 photographs are also included. The diary sells for $8.95, with quantity discounts available. Contact Workman at 1 W. 39 St., New York, NY 10018.

20/20 FORESIGHT



Right in any light. Comrex word processing monitors.

Fluorescent. Incandescent. Natural. Artificial. Comrex has word processing monitors for any kind of light. The CR-5400: a compact, nine-inch diagonal screen; the CR-5600: a twelve-inch screen. Both available in green, yellow-green or amber displays with tack-sharp resolution. Easy on the eyes. Both so affordable they could only come from Comrex. Easy on the wallet. The CR-5400. The CR-5600. The monitors for your eyes, your lighting, your wallet, you.

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KERRY LEICHTMAN

END TRANSMISSION

BUT IS IT BETTER THAN A CANOE ON A DAY PERFECT FOR FISHING?

Every Model 100 owner I know grins a lot; especially when explaining their new computer to someone else; especially when debating portability and ease of use with an Osborne owner; especially when traveling on an airplane next to an Osborne or Kaypro or Compaq owner. Why are we all grinning so much? There's something very special about a computer you can learn to operate in five minutes, that's why.

I loaned my Model 100 to a friend for a conference he attended in Washington, D.C. Computers are not second or even third nature to him. Being the publisher of *Canoe* magazine, his interests lie more in surviving a white water escapade than weaving his way through a computer's operating system. But I told him nothing except to pay special attention to the battery power warning light. I gave him my computer, the manuals, and the power adapter cord.

CANOE TRADE. When he returned from Washington he was so excited he offered a trade: my Model 100 for a canoe. Although I wanted a canoe very badly, I turned him down. After all, a canoe won't fit in my briefcase, nor will it keep track of my appointment calendar, nor will it dial my phone and hook me into CompuServe or the Source, nor will it help me divide my paycheck amongst a hungry throng of creditors. Then again, my Model 100 won't do me much good on a crisp perfect-for-fishing fall day.

Tandy's Model 100 represents the next advance in personal computers — ease of use. It is that advance that allowed me to give this computer to my canoeist friend without hours of handholding. If forced to teach someone how to operate the 100, here's how I do it:

OPERATING THE 100. "Turn it on. To use the word processor, position the highlighter (cursor can be too advanced a term) over the word text and press the enter key. Name the file using no more than six letters (characters can be too advanced a term, also). Type. To add (insert, too advanced) letters or words, place the flashing box at that spot and type. To delete, place the flashing box at the spot and press the shift and DEL BKSP keys at the same time. That's the basics. You'll be ready for an advanced lesson in an hour." I had the routine down to a single sentence, but it doesn't work well grammatically.

The 100's three main features (portability, word processing, and communications ability) are not what makes it such an outstanding machine. Jon Shirley, former vice president of computer marketing at Tandy, during a presentation at the Boston Computer Society some months back, spoke of the 100's "invisible operating system." If you had to isolate one feature as being the Model 100's best, it would have to be that. The fourth, undocumented, feature of the Model 100 is its finest achievement. The more you examine the machine's inherent capabilities, the more you have to admire the work Tandy and MicroSoft put into your 100's ROM.

EASY LABOR. That work makes our job a lot easier. A magazine's place is to help you better understand your computer and provide more ways for you to use it. The Model 100's ease of use makes that task much easier, leaving us more time to provide you with uses and ideas. Consider *Portable 100* magazine as a forum for users, novice and expert alike, to share computing experiences, applications, and expectations. Not since Tandy introduced the Model I has a single microcomputer captured the attention and imagination of so many different people. That was back in 1977. Computers have come a long way since then. Your Model 100 represents the best of microcomputer technology during those six years. What a treat!

NEXT.100

A key to portability is being able to use your 100 where you transport it. One of those places is bound to be a hotel. Will your hotel have a modular phone for your direct-connect modem? How will the hotel management react to you bringing the communications revolution into their hostelry? Those are some of the questions *Portable 100* will answer in next month's issue. Also, two former editors of *Byte* will be looking at alternative power sources for your 100 from gel cells to solar cells. Meanwhile Bill Louden will tell you how to handle plane reservations through CompuServe, Jake Commander will have some more ROM goodies for us, and much, much more. So be with us for the October issue of *Portable 100!*

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Description	Radio Shack Model 4	IBM PC	Apple IIe
Two-Drive Unit	**$1999**	$1864	$1995
Formatted Disk Capacity	**174Kb each (TRSDOS)**	180Kb (DOS 2.0) 160Kb (DOS 1.0)	124Kb (DOS 3.3)
80-Column	**Included**	Included	Included
Monitor	**Included**	$345	Included
Monitor Adapter	**Not Required**	$335	Not Required
First Drive	**Included**	Included	Included
Second Drive	**Included**	$289	$395
Parallel Printer Interface	**Included**	Included	$165
Serial Interface	**Included**	$120	$195
Reference Books	**Included**	Included	$50
Numeric Pad	**Included**	Included	$159.95
Diskette Operating System	**Included**	$60	Included
Total	**$1999***	$3013	$2959.95

The Perfect Match for the TRS-80 Model 100. For performance and price, our Model 4 desktop computer is the professional approach to improving your productivity. Best of all, Model 4 and our Model 100 portable computer work together as a team. You can upload and download programs and data via the RS-232 communications interface. And you can interchange text on cassette using the "Tape 100" utility.

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